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UNITED STATES DEPARTMENT OF COMMERCE

Frederick B. Dent, *Secretary*

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Robert M. White, *Administrator*

NATIONAL MARINE FISHERIES SERVICE

Robert W. Schoning, *Director*

FOREWORD

The Department of Commerce's National Marine Fisheries Service publishes the monthly journal *Marine Fisheries Abstracts* as one means of communicating to the fishing industry and allied groups the status of current fishery research. The research includes the biological aspects of fishery science as well as technological studies dealing with aquatic resource supply, harvesting, processing, utilization, and distribution.

Marine Fisheries Abstracts contains summaries of selected articles from trade, engineering, and scientific journals dealing with the entire spectrum of fishery science. The publication is designed to serve the needs of fishery scientists, engineers, and managers in industry, academic institutions, and government by supplying timely information on current progress in fishery research and technology.

0.110 (9.11) RAPID ASSESSMENT OF OCEAN ENVIRONMENT AIDED BY NEW SHIPBOARD STD DIGITIZER-COMPUTER INTERFACE Ingraham, W. James, Jr., and C. J. Bartlett (National Marine Fisheries Service, Northwest Fisheries Center, Seattle Laboratory, Seattle, WA 98112) Marine Fisheries Review <u>35</u>, No. 7, 10-14 (July 1973) As part of the new NMFS Marine Resources Monitoring Assessment and Prediction (MARMAP) Program, oceanographers are searching for key measurements to assist them in providing forecasts of the fisheries. One problem confronting these oceanog- raphers is the rapid, accurate assessment of the ocean environment. A recent development of interest is the linking of a Plessey Environmental Systems STD (salinity-temperature-depth) data acquisition system to a Digital Equip- ment Corporation PDP-8 computer aboard the NMFA Northwest Fisheries Center's RV George B. Kelez. This involves installation of a digitizer-interface unit and has been accomplished and field-tested by personnel of the Center's Oceanography Pro- gram. Because this unit may become standard equipment aboard NMFS research vessels, a complete description is presented here. Since the origin of reversing water bottles, salinity and temperature measure- ments at depth have been obtained by positioning several of these bottles (with precision reversing thermometers attached) along a cable at various depths in the ocean. Discrete water samples thus obtained were analyzed for salinity by chemical titrations or, more recently, by electronics (laboratory) salinometers. The de- tails in the temperature and salinity structure with depth depended upon the number of Nansen bottles used. This time-consuming method has recently been supplemented by electronic sensors attached to conductor cables which, as they are lowered into	0.35 (9.19) COMPLEX EQUILIBRIA INVOLVING DDT AND MODEL COMPOUNDS FOR PHOSPHOLIPID AND PROTEIN Wilson, Nancy K., and William E. Wilson (National Institute of Environmental Health Sciences, P.O. Box 12233, Research Triangle Park, NC 27709) Science of the Total Environment <u>1</u>, No. 3, 245-251 (Nov. 1972) (Elsevier Publish- ing Company, Amsterdam, Netherlands) The pesticide DDT [1,1,1-trichloro-2,2-bis(p-chlorophenyl)ethane] is widely distributed in the environment, occurs in human adipose tissue, and is toxic. The mode of toxicity of DDT has not been unequivocally established, but it appears to alter nerve membranal properties and to inhibit membranal (Na⁺ + K⁺)ATPase activ- ity. The present study was carried out to obtain a better understanding of the molecular interaction capabilities of DDT. Equilibrium constants and values of the thermodynamic parameters for the formation of complexes between D,p'-DDT and compounds containing biologically sig- nificant functional groups were obtained by proton magnetic resonance. The re- sults seem to indicate that the phospholipid phosphate and ester groupings and aromatic substituents in protein are the most likely important binding sites for DDT which might underlie its inhibitory effects on enzyme activity. [2 figures, 1 table, 22 references] FTP	0.35 LIPID AND FATTY ACID COMPOSITION OF FROG PHOTORECEPTOR OUTER SEGMENTS Mason, W. T. (Dept. of Chemistry, Case Western Reserve University, Cleveland, OH 44106), R. S. Fager, and E. W. Abrahamson Biochemistry <u>12</u>, No. 11, 2147-2150 (May 22, 1973) The rod outer segment is the primary photopic receptor of the vertebrate retina. The rods are highly organized stacks of flattened saccules surrounded by a plasma membrane. The rod outer segments are connected to the remainder of the cell body containing the energetic and synaptic machinery of the cell. The disk- like membranes of the rod contain the photosensitive visual pigment rhodopsin. It is likely that the lipid of the membrane plays an important role in the visual ex- citation process. The frog retina has been the single most important tissue used in the biochem- ical and physiological studies of the visual process. In the present study, frog rod outer segments were purified by density gradient centrifugation and were ex- amined to determine their phospholipid and neutral lipid content and the respec- tive fatty acid profiles of these classes. The frog photoreceptor outer segment membranes contained large amounts of palmitic (16:0), stearic (18:0), linolenic (18:3), and docosahexanoic (22:6) acid. They contained a relative abundance of glycolipid (25% of the total lipid) and a small amount of cholesterol (2%). The photoreceptor membrane is composed of protein (91%) and lipid (39%); rhodopsin was 27% of the total lipoprotein of the membrane (dry weight basis). The predominant phospholipid components of the rod segments	0.32 (2.8) EFFECT OF DIFFERENT HEAT TREATMENT PROCESSES ON THE AMINO ACID COMPOSITION OF PROTEINS IN THE CARP Amun, M. B. (Mosk, Inst. Nar. Khoz. im. Plekhanova, Moscow, U.S.S.R.) Chemical Abstracts <u>78</u>, No. 23, 146426a (June 11, 1973)
0.110 (9.11) RAPID ASSESSMENT OF OCEAN ENVIRONMENT AIDED BY NEW SHIPBOARD STD DIGITIZER-COMPUTER INTERFACE Ingraham, W. James, Jr., and C. J. Bartlett (National Marine Fisheries Service, Northwest Fisheries Center, Seattle Laboratory, Seattle, WA 98112) Marine Fisheries Review <u>35</u>, No. 7, 10-14 (July 1973) As part of the new NMFS Marine Resources Monitoring Assessment and Prediction (MARMAP) Program, oceanographers are searching for key measurements to assist them in providing forecasts of the fisheries. One problem confronting these oceanog- raphers is the rapid, accurate assessment of the ocean environment. A recent development of interest is the linking of a Plessey Environmental Systems STD (salinity-temperature-depth) data acquisition system to a Digital Equip- ment Corporation PDP-8 computer aboard the NMFA Northwest Fisheries Center's RV George B. Kelez. This involves installation of a digitizer-interface unit and has been accomplished and field-tested by personnel of the Center's Oceanography Pro- gram. Because this unit may become standard equipment aboard NMFS research vessels, a complete description is presented here. Since the origin of reversing water bottles, salinity and temperature measure- ments at depth have been obtained by positioning several of these bottles (with precision reversing thermometers attached) along a cable at various depths in the ocean. Discrete water samples thus obtained were analyzed for salinity by chemical titrations or, more recently, by electronics (laboratory) salinometers. The de- tails in the temperature and salinity structure with depth depended upon the number of Nansen bottles used. This time-consuming method has recently been supplemented by electronic sensors attached to conductor cables which, as they are lowered into	0.32 PRESENCE AND THERMOSTABILITY OF CALCIUM-BINDING PROTEINS IN THE INTESTINAL AND BRANCHIAL MUCOUS MEMBRANES OF VARIOUS TELEOSTS Chartier Baraduc, Marie Madeleine (Lab. Physiol. Etres Mar., Inst. Oceanogr., Paris, France) Chemical Abstracts <u>78</u>, No. 23, 145399g (June 11, 1973)	0.35 LIPID AND FATTY ACID COMPOSITION OF FROG PHOTORECEPTOR OUTER SEGMENTS Mason, W. T. (Dept. of Chemistry, Case Western Reserve University, Cleveland, OH 44106), R. S. Fager, and E. W. Abrahamson Biochemistry <u>12</u>, No. 11, 2147-2150 (May 22, 1973) The rod outer segment is the primary photopic receptor of the vertebrate retina. The rods are highly organized stacks of flattened saccules surrounded by a plasma membrane. The rod outer segments are connected to the remainder of the cell body containing the energetic and synaptic machinery of the cell. The disk- like membranes of the rod contain the photosensitive visual pigment rhodopsin. It is likely that the lipid of the membrane plays an important role in the visual ex- citation process. The frog retina has been the single most important tissue used in the biochem- ical and physiological studies of the visual process. In the present study, frog rod outer segments were purified by density gradient centrifugation and were ex- amined to determine their phospholipid and neutral lipid content and the respec- tive fatty acid profiles of these classes. The frog photoreceptor outer segment membranes contained large amounts of palmitic (16:0), stearic (18:0), linolenic (18:3), and docosahexanoic (22:6) acid. They contained a relative abundance of glycolipid (25% of the total lipid) and a small amount of cholesterol (2%). The photoreceptor membrane is composed of protein (91%) and lipid (39%); rhodopsin was 27% of the total lipoprotein of the membrane (dry weight basis). The predominant phospholipid components of the rod segments	0.32 (2.8) EFFECT OF DIFFERENT HEAT TREATMENT PROCESSES ON THE AMINO ACID COMPOSITION OF PROTEINS IN THE CARP Amun, M. B. (Mosk, Inst. Nar. Khoz. im. Plekhanova, Moscow, U.S.S.R.) Chemical Abstracts <u>78</u>, No. 23, 146426a (June 11, 1973)

GEL FRACTION FROM FISH MUSCLE EXTRACT. IV. MYOSIN-LIKE PROTEIN IN GEL FRACTION FROM FROZEN-STORED MUSCLE

Umemoto, Shigeru, and Koichi Kanna (Coll. Agric. Vet. Med., Nihon Univ., Tokyo, Japan)

Chemical Abstracts 78, No. 11, 70395s (Mar. 19, 1973)

were phosphatidylcholine (45%), phosphatidylethanolamine (26%), phosphatidylserine (15.1%), and sphingomyelin (6.4%).

The five major fatty acid components detected (namely, palmitic, stearic, linoleic, docosanoic, and docosahexanoic acid) in the frog disk membranes show an accumulation of shorter chain fatty acids in the metabolic pathway rather than preferential completion of the pathway to docosahexanoic acid found in the bovine rod outer segment membranes. Also, the frog disk membranes were found to be unlike invertebrate (aquid) rhadomes in this metabolic preference for fatty acid buildup. The authors indicate that the characteristics of the frog visual pigment membrane system make it appear likely that the fluidity of the lipid region facilitates molecular motion of the chromoprotein.

[3 tables, 26 references]

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[11 references]
pound by the addition of ethanol during the extraction process.

Chemical Abstracts 78, No. 7, 41712n (Feb. 19, 1973)

CHANGE IN GLYCOLIS AND PROTEINS IN THE MUSCLES OF MIRROR CARP DURING FREEZING AND COLD STORAGE

0.33

0.110 (9.11)

the sea, give continuous analog graphical traces of the temperature and salinity profiles vs depth on recorders in the vessel's laboratory.

This analog system provides a visual display which allows oceanographers to easily locate and follow discrete strata or ocean fronts which may influence the distributions of the plankton or fish. Unfortunately, the time and personnel available for accurate analyses of data during field operations is usually limited and the extraction and correction of specific values of temperature and salinity from these graphs are not only time consuming and laborious but limit the analyses which may be done at sea. Conversion of the analog signals to digital format and processing them by computer eliminates manual processing and permits additional analyses such as field of density and geostrophic ocean currents. The method of digitizing the signal from the Plessey Environmental System's Model 9006 or 9040 and interfacing the unit with a PDP-computer is described in the article.

[5 figures, 1 table]

Reprinted in part

[42 figures, 175 references]

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Chemical Abstracts 78, No. 11, 70363e (Mar. 19, 1973)

Kanna, Koichi, Kiyonari Kakuda, and Masahiro Sakuraba (Coll. Agric. Vet. Med., Nihon Univ., Tokyo, Japan)

PREVENTIVE EFFECT OF AMINO ACIDS AND OXY ACIDS

0.33

A NOVEL ANTI-BIOTIC FROM A SPONGE OF THE GENUS VERONGIA

(0.5)

0.35 A

APPLICATIONS OF ^{13}C NUCLEAR MAGNETIC RESONANCE IN BIOCHEMISTRY

Gray, G. A. (Varian Associates, Eastern Regional Applications Laboratory, Springfield, N. Y.)

Critical Reviews in Biochemistry 1, No. 2, 247-304 (1973)

This review covers the progress in the applications of ^{13}C nuclear magnetic resonance (NMR) in biochemistry in the past several years. This is the first time

resonance (NMR) in biochemistry in the past several years. This is the first time such information has been collected in one publication. Some basic background on ¹³C NMR and the new techniques useful for it are given. Techniques are described, such as various types of decoupling, fourier transform NMR, selective enrichment, and spinlattice relaxation, in conjunction with relevant biochemical applications. The specific topics considered include carbohydrates, steroids, alkaloids, natural products, biosynthetic pathways as deduced by specific enrichment of nutrients, nucleosides and nucleotides, amino acids, peptides, polypeptides, antibiotics, proteins, enzymes, biopolymers, heme globins, corrinoids, relaxation interpretation, phospholipids, and membrane structures.

0.36 (0.38) ENZYMES IN FACULTATIVE ANAEROBOSIS OF MOLLUSCS--I. MALIC ENZYME OF OYSTER ADDUCTOR MUSCLE Hochachka, P. W., and T. Mustafa (Dept. of Zoology, University of British Columbia, Vancouver 8, British Columbia, Canada) Comparative Biochemistry and Physiology <u>45</u>, No. 3B, 625-637 (July 15, 1973) II. BASIC CATALYTIC PROPERTIES OF PHOSPHOENOLPYRUVATE CARBOXYKINASE IN OYSTER ADDUCTOR MUSCLE Mustafa, T., and P. W. Hochachka, <i>ibid.</i>, pp. 639-655. III. PHOSPHOENOLPYRUVATE CARBOXYKINASE AND ITS ROLE IN AEROBIC-ANAEROBIC TRANSITION Mustafa, T., and P. W. Hochachka, <i>ibid.</i>, pp. 657-667. During anoxia in facultative anaerobic molluscs, such as oysters, glucose is metabolized to succinate and alanine (not to lactate as in anoxic vertebrate tissues). Two questions remain outstanding regarding this metabolic conversion: (1) What is the biological significance of this kind of metabolic organization? and (2) What are the precise metabolic pathways involved? The first question was considered by the authors in an earlier report [Science <u>178</u>, 178, 1691-1696 (1972)]. In part I, they consider the functional properties of malic enzyme in the adductor	0.39 (1.87) CAROTENOID PIGMENTS OF SPINY LOBSTER Matsuno, Takao, Takahisa Kusumoto, Tetsuo Watanabe, and Yasuro Ishihara (Kyoto Coll. Pharm., Kyoto, Japan) Chemical Abstracts <u>78</u>, No. 17, 108477k (Apr. 30, 1973)
0.38 (1.37) TRIGLYCERIDE HYDROLYSIS BY THE PANCREATIC LIPASE SYSTEM OF TROUT (SALMO GAIARDNERI). DETECTION OF A NEW TYPE OF SPECIFICITY OF ACTION Leger, Claude, Dominique Bauchart (Inst. Natl. Rech. Agron., Cent. Natl. Rech. Zootech., Jouy-en-Josas, France) Chemical Abstracts <u>78</u>, No. 11, 68591j (Mar. 19, 1973) PEROXIDASE FROM THE RED ALGA <i>CYSTOCLONIUM PURPUREUM</i> Murphy, M. J., and C. O'Riordan (Dep. Biochem., Univ. Coll., Galway, Ireland) Chemical Abstracts <u>78</u>, No. 11, 68600m (Mar. 19, 1973)	0.4 (6.31) MODEL WHICH GENERATES RED TIDES Wyatt, T., and J. Horwood (Ministry of Agriculture, Fisheries, and Food, Fisheries Laboratory, Lowestoft, Suffolk, England) Nature <u>244</u>, No. 5413, 238-240 (July 27, 1973) The order Dinoflagellata contains species of free swimming algae which commonly cause what are known as red tides. Species of <i>Trichodesmium</i> are also associated with the phenomenon. Many of these algae produce poisons which are destroyed or diluted as rapidly as they are excreted, and the environment they inhabit remains harmless. However, under certain conditions not yet understood, the algae and the toxic excretions become abundant causing a red tide. The red tide, if prolonged, may be followed by a mass kill of fish and other organisms. Other reports indicated conditions that frequently precede red tide outbreaks: heavy rainfall, calm sunny weather, and an influx of estuarine waters resulting in a meeting of dissimilar water masses. These conditions promote a reduction in vertical mixing rates of the water column which allows the motile algae to concentrate more easily in preferred layers of water for optimal reproduction. The migration of these algae to a restricted part of the water column is accompanied by a release from grazing pressure by zooplankton. In addition, the nonmotile phytoplankton, unable to migrate to the preferred layers of the water, will be subject to increased grazing pressure by the zooplankton. Thus the motile species, released from grazing pressure and under conditions for optimal reproduction, could become dominant. Under these relatively pure culture conditions, the color of the colony changes from green to yellow, amber, brown, or red. Continuation of such

Smith, C. L. (Dep. Zool., Univ. Liverpool, Liverpool, England)
Chemical Abstracts 78, No. 17, 107766s (Apr. 30, 1973)

0.4 (6.31)

growth causes either depletion of nutrients or limitation of light due to the density of algal growth. Either condition leads to the termination of reproduction and death of the algae. Toxins released by the dead cells, followed by decay and oxygen depletion, could result in the poisoning and death of neighboring fish and other organisms.

The author has constructed a mathematical model which related the appearance of red tides to the following factors: swimming speed of dinoflagellates, reproductive rate of phytoplankton, number of zooplankton grazers, grazing rate, light radiation, and vertical stability of the water column. The model is a mathematical expression of the hypothesis that, given the presence of the red tide organisms, they will become more abundant with increasing vertical stability of the water mass. The predictability of the model has not yet been tested.

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Chemical Abstracts 78, No. 17, 108479n (Apr. 30, 1973)

Nagasaki, Japan)

THIAMINASE I IN MARINE FISH. II. DISTRIBUTION OF THIAMINASE IN MARINE FISH

0.38

0.36 (0.38)

muscle of the Pacific oyster (*Crassostrea gigas*). Parts II and III deal with the properties of phosphoenolpyruvate carboxykinase in the adductor muscle of the oyster and its potential role in the aerobic-anaerobic transition. [Part I: 5 figures, 3 tables, 16 references; Part II: 9 figures, 3 tables, 19 references; Part III: 6 figures, 17 references.]

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[Part I: 5 figures, 3 tables, 16 references; Part II: 9 figures, 3 tables, 19

Mar'yanovskaya, M. V. (U.S.S.R.)
Chemical Abstracts 78, No. 23, 145452u (June 11, 1973)

INDEXES OF CARBOHYDRATE METABOLISM IN ONE-YEAR-OLD AND TWO-YEAR-OLD CRUCIAN CARP DURING THE GROWING SEASON AND WINTERING PERIOD

0.36

0.39
(1.9)
PURIFICATION OF BEEF BRAIN AND EEL ELECTRIC ORGAN
ACETYLCHOLINESTERASE BY GAS CHROMATOGRAPHY

Cnan, S. L., D. V. Shirachi, H. N. Bhargava, E. Gardner, and A. J. Trevor (Dep Pharmacol, Univ. California, San Francisco, Calif.)
Chemical Abstracts 78, No. 17, 107474v (Apr. 30, 1973)

MEASUREMENT OF CIRCULATING THYROXINE IN SEVERAL FRESHWATER TELEOSTS BY COMPETITIVE BINDING ANALYSIS

0.39

Higgs, D. A., and J. G. Eales (Dep. Zool., Univ. Manitoba, Winnipeg, Manitoba, Canada)

Chemical Abstracts 78, No. 17, 108480f (Apr. 30, 1973)

Lederer, J. (Louvain, Belgium)
Chemical Abstracts 78, No. 17, 109344b (Apr. 30, 1973)

0.4 NITROSAMINES, POLLUTING CARCINOGENS FROM FOODS

0.38
THIAMINASE I IN MARINE FISH. II. DISTRIBUTION OF
THIAMINASE IN MARINE FISH

0.4
(0.6)

THE ACCEPTABLE DAILY INTAKE OF FOOD ADDITIVES
Bigwood, E. J. (Food Law Research Centre, Institute of European Studies, University of Brussels, Brussels, Belgium)
Critical Review in Toxicology 2, No. 1, 41-93 (1973)

During the past 15 years the Joint FAO-WHO Expert Committee on Food Additives has evaluated the acceptable daily intake of more than 200 food additives. This work is of major importance in the field of the national and international public health policies concerning the control of the use of food additives and, consequently, the control of food quality. The present review is an analysis of the work done by the Committee.

[8 references]

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MARINE FISHERIES ABSTRACTS VOL. 26 NO. 10 PAGE 5

0.5
(2.05)

VIRUSES IN FOODS

Potter, Norman N. (Dept. of Food Science, Cornell University, Ithaca, NY 14850)
Journal of Milk and Food Technology 36, No. 6, 307-310 (June 1973)

Viruses are subcellular entities with structure, organization, and size comparable to that of large molecules. They can be introduced into specific living cells and will reproduce only inside such cells. The intimate association of virus and host cell results in an alteration of or ultimate destruction of the host cell.

Many virus-food interrelationships are not yet understood; thus assessment of the health hazard from several foodborne viruses cannot be made. Comparatively little research is being carried out on viruses in foods. Many technical difficulties hinder progress in this field such as problems in epidemiological recognition, methods of virus detection and identification from foods, and the sometimes long incubation periods required that make problematic the conclusive relation between disease and a given food.

This article, a review of the pertinent literature on viruses in foods, contains a discussion of some of the problems inherent in studies of viruses in foods and points out several areas where research is needed.

[30 references]

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MARINE FISHERIES ABSTRACTS VOL. 26 NO. 10 PAGE 5

0.5
(2.05)

INCIDENCE OF SALMONELLAE IN COMMERCIALLY PREPARED SANDWICHES FOR THE VENDING TRADE

Khan, N. A., and T. A. McCaskey (Dept. of Animal and Dairy Sciences, Auburn University, Agricultural Experiment Station, Auburn, AL 36830)
Journal of Milk and Food Technology 36, No. 6, 315-316 (June 1973)

A survey was made to determine the incidence of salmonellae in sandwiches prepared in commercial kitchens for distribution through vending machines. A total of 646 sandwiches of 13 different types from vending machines and from the kitchens of five distributors were examined. Salmonellae organisms were not found in any of the sandwiches. The authors concluded that the routine use of mayonnaise and other acid ingredients along with the proper maintenance of hygienic conditions and the effective temperature control of vending machines were important in the prevention of Salmonella infection in commercially prepared sandwiches.

[1 table, 9 references]

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MARINE FISHERIES ABSTRACTS VOL. 26 NO. 10 PAGE 5

0.5
(1.953)

NEISSERIA SPECIES ISOLATED FROM DOLPHINS

Vedros, Neylon A., Phyllis I. Warren (Naval Biomedical Research Laboratory, University of California, Berkeley, CA 94720), and D. G. Johnson
Journal of Wildlife Diseases 9, No. 3, 241-244 (July 1973)

The authors are participating in long-term studies of the total microbial profile of marine mammals in their natural habitat and of the changes that occur when they are brought into contact with man and other animals and when placed in isolation under husbandry conditions. In the course of these studies, swabbings from different areas of the bodies of 35 wild dolphins (Lagenorhynchus obliquidens media for isolation and identification. The dolphins (Lagenorhynchus obliquidens media and Delphinus bairdi) were brought aboard ship by divers and within 10 min the swab samples were obtained; the animals were then returned to the ocean. Only five of the bacterial isolates were gram-negative, oxidase positive, diplococci. These cultures were isolated from the blowhole of two female L. obliquidens and the blowhole, mouth, and throat of three D. bairdi females. The colonial morphology and production of acid in media containing 1% carbohydrate narrowed the isolate cultures to one of three species of chromogenic Neisseria, that is, N. mucosa, N. sicca, or N. perflava. The dolphin isolates were able to reduce nitrates with the production of gas, the most critical biochemical reaction used to identify the prototype N. mucosa. Serology and pathogenicity for mice were also similar. The authors concluded that the dolphin isolates can best be classified as N. mucosa var. heidelbergensis. This organism was found to be present in the nasopharynx of

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0.5 EFFECT OF TEMPERATURE AND pH ON GROWTH AND ENTEROTOXIN PRODUCTION BY *STAPHYLOCOCCUS AUREUS*

Scheuener, D. L., L. L. Hood, and L. G. Harmon (Dept. of Food Science and Human Nutrition, Michigan State University, East Lansing, MI 48823) *Journal of Milk and Food Technology* 36, No. 5, 249-252 (May 1973)

The purpose of this study was to determine the effect of temperature on the growth and enterotoxin production of four immunologically different strains of *S. aureus* and the effect of pH on production of enterotoxin B by *S. aureus* strain 243. The four strains of *S. aureus* used and the type of enterotoxin they produce are: 265 (type A), 243 (B), 493 (C), and 315 (D). The four strains were incubated at temperatures ranging between 7° and 50° C. At 45° C all strains grew and produced enterotoxin except strain 243; there was a decrease in viable cells of this strain and no enterotoxin (type B) was produced. All strains grew and produced enterotoxin when incubated in the range of 19° to 39° C. Strains 265, 243, and 493 grew at 13° C, but only strain 243 produced enterotoxin (type B). It appears that the pH ranges for growth and enterotoxin production by *S. aureus* strain 243 are probably similar in broth and food. If this is true, the data suggest that foods within the pH range of 5.1 to 9.0 and which contain *S. aureus* strain 243 may be considered to have potential for food poisoning if other environmental conditions are favorable.

[3 tables, 18 references]

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0.4 EVIDENCE FOR PHEROMONE-INFLUENCED HOMING BY MIGRATING ATLANTIC SALMON, *SALMO SALAR* (L.)

Solomon, D. J. (Salmon and Freshwater Fisheries Laboratory, Whitehall Place, London SW1A 2HH, England) *Nature* 244, No. 5413, 231-232 (July 27, 1973)

Early reports indicated conclusively that olfaction in Pacific salmon causes homing to the stream of their birth. Other reports indicated that the homing of adult salmonids may be influenced by pheromones or chemicals secreted by a specific fish population. The author suggests that the presence of salmon parr in a river causes its estuary to attract migrating adults, and the metabolic products excreted by the young salmon could be the attractant to which the adults home. The author cites as evidence reports of an attempt to establish salmon in a tributary of the Parrett River which empties into the Bristol Channel. In the years following the hatching of the eggs, the number of salmon caught in the Parrett River estuary increased several fold. Most of the catch did not originate from the newly established fishery; by previous tagging they were found to originate from three other salmon rearing rivers. The author believes that these fish found the nonhome river attractive because of the presence of the pheromone excreted by the young salmon lying in the upper reaches of the tributary river.

[2 figures, 19 references]

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0.5 (1.953)

48 out of 100 healthy human individuals tested; in addition, it has been implicated as the etiological agent of pneumonia in children. The probable route of transmission is through the respiratory tract. The authors suggest that this information should be considered by those investigators who work very closely with dolphins in their husbandry and training programs.

[2 tables, 4 references]

SW

Surendran, P. K., and K. Mahadeva Iyer (Cent. Inst. Fish. Technol., Ernakulam, India) *Chemical Abstracts* 79, No. 3, 13963x (July 23, 1973)

1. BEHAVIOR OF MARINE MICROFLORA TOWARDS ANTIBIOTICS. SENSITIVITY TOWARDS CHLOROTETRACYCLINE (CTC)

0.5 MECHANISM OF THERMAL DEATH OF BACTERIAL SPORES: ELECTRON-MICROSCOPIC OBSERVATIONS

Prokop, A. (Dept. of Technical Microbiology, Institute of Microbiology, Czechoslovak Academy of Sciences, Prague 4, Czechoslovakia), and A. E. Humphrey (Biochemical Engineering Laboratory, University of Pennsylvania, Philadelphia, Pa.) *Folia Microbiologica* 17, No. 6, 437-445 (1972). Distributed by Academic Press, Inc., 24-28 Oval Road, London NW17 0U, England)

The thermal death rate of vegetative microorganisms is described by a logarithmic curve. In contrast, the death rate of bacterial spores is nonlogarithmic. A possible mathematical model for this nonlogarithmic death rate involves an intermediate state in which the spores are viable but have been made thermally susceptible by the initial heating. The authors investigated the intermediate state by observing cytological changes in the spores for evidence to corroborate the mathematical model. Spores of *Bacillus stearothermophilus* (FS 7954) were exposed to thermal shock as follows: 100° C for 5 min; 110° C for 4 min; 110° C for 10 min; and 110° C for 30 min.

Morphology of the spores, during the early heat exposure, remained unchanged from the initial state. Some changes were observed in the laminated inner-coat layer of the spore. This layer is reported to consist of keratin fibrils. These fibrils were observed to contract upon heating which causes, it is believed, some water to be expelled from the spore protoplast. The authors suggest that this contraction enhances the thermal resistance of the spore and accounts for the nonlogarithmic death curve. On prolonged heating, the death of the spore occurs with the loss of the coat integuments and protoplast envelopes.

[2 figures, 4 tables, 31 references]

SW

Higman, James B. (editor)

University of Miami, Rosenstiel School of Marine and Atmospheric Science, Gulf and Caribbean Fisheries Institute, Coral Gables, Fla. (May 1973), 184 pp. Price not given.

The proceedings were divided into four sessions, and each session was devoted to a major topic. The conference was opened with an address by the Honorable Thomas N. Downing, House of Representatives; the subject was on the trends in U.S. fishery policy. The major topic of the first session was territorial seas. Six papers were presented dealing with the law of the sea relative to fisheries, agreements between the United States and Brazil and the Guianas on their shrimp fisheries, and the Mexican view of her coastal seas.

The second session covered food technology and fisheries management. The papers dealt with international standards and nutritional labeling of fishfood products, defrosting shrimp, and quality control of shrimp. The last paper in this group covered State and Federal management of coastal fisheries.

The next session was devoted to reports of research supported entirely or in part by the National Sea Grant Program of NOAA. The first five papers covered technical subjects: estimating abundance of fish from egg and larval counts in the Gulf of Mexico, migration of spiny lobsters, a longline retrieval system, quality control of fish products, and processing sanitation relative to bacterial levels in blue crab. The last paper in this session was a discussion of the necessity for complete utilization of fish in food production.

Austic, R. E. (Dept. of Poultry Science and Graduate School of Nutrition, Cornell University, Ithaca, NY 14850)
Journal of Nutrition 103, No. 7, 999-1007 (July 1973)

Studies were conducted to determine whether the conversion of arginine to proline may occur in the young chick. Feeding a diet devoid of proline resulted in a growth depression which could not be relieved by dietary supplements of arginine or ornithine. In two experiments using arginine-5-³H, however, it was found that chicks which were fed the proline-free diet converted a portion of the dietary arginine directly to proline. Approximately 7% of the arginine from the basal diet containing 1.0% arginine was converted to proline by chicks fed the proline-free diet. This represented on a molar basis most of the arginine which was catabolized as estimated from urea excretion. It is concluded that the chick can convert arginine directly to proline, but that the amount of proline synthesized in this manner represents but a small part of the total amount of proline needed for growth.

Author's abstract

[1 figure, 6 tables, 39 references]

Scott, M. L. (Dept. of Poultry Science and Graduate School of Nutrition, Cornell University, Ithaca, NY 14850)
Journal of Nutrition 103, No. 6, 803-810 (June 1973)

Selenium is an essential nutrient, and at low levels in the diet it prevents death from deficiency in a variety of species. At high levels in the diet, selenium is extremely toxic and may be carcinogenic. Selenium was discovered by the Swedish chemist J. J. Berzelius more than 150 years ago [Schweigger, J., 21, 1818-23 (1817)]. Its toxicity was demonstrated in 1934 when K. W. Franke [J. Nutr. 8, 597-608 (1934)] indicated that high levels of selenium in plant foodstuffs were responsible for alkali disease in cattle. The nutritional requirement for selenium is in the range of 0.1 to 0.3 p.p.m. It is, however, extremely toxic; levels of selenium in the range of 2 to 10 p.p.m. cause chronic toxicity, and levels above 10 p.p.m. produce drastic changes that result in sudden death.

Furthermore, the studies reported suggest that selenium has an inhibitory effect on cancer produced by various carcinogens. It appears that the evidence indicating a carcinogenic effect of high doses of selenium is open to question. [36 references]

FTP

Hubbell, Charles H.
Feedstuffs 45, No. 30, 28-29 (July 23, 1973)

The table is published annually; it is a summary of the latest analyses of various feed ingredients. For each ingredient, the content of protein, fat, fiber, calcium, phosphorus, and ash are given. Concentrations (milligrams per pound) of three essential growth factors are given: riboflavin, niacin, and pantothenic acid. In addition, the content (in percent) of the amino acids arginine, lysine, methionine, cystine, tryptophan, and glycine in each ingredient is given. Concentration of choline is also shown. Magnesium, potassium, and sulfur content of selected feedstuffs are shown. The ingredients listed include grains, oil seed meals, fish meal, alfalfa, and whey; and byproducts of distilleries, fruit processors, and SW meat packers.

0.7 INTERACTION OF DIETARY FLUORIDE AND MAGNESIUM IN GUINEA PIGS

O'Dell, B. L., R. I. Moroni, and W. O. Regan (Dept. of Agricultural Chemistry, University of Missouri, Columbia, MO 65201)
Journal of Nutrition 103, No. 6, 841-850 (June 1973)

Weanling male guinea pigs were fed a magnesium-deficient diet (25 p/m) based on EDTA-treated soybean protein, to which graded levels of magnesium and fluoride were added as supplements in an attempt to determine the nature of the physiological interaction of the two elements. A 100 p/m level of fluoride in the diet was the most efficacious in the stimulation of growth, prevention of mortality and prevention of kidney calcification. When magnesium was severely limiting, 200 p/m F came toxic and caused lameness and swollen feet; adequate magnesium largely overcame the deleterious effect. Fluoride (100 ppm) decreased from 1,600 to 600 p/m the dietary magnesium concentration required to support the maximum growth rate. At the lower level of dietary magnesium, fluoride supplementation resulted in higher plasma magnesium concentration, but the increase was not sufficient to restore the elevated level of plasma inorganic phosphorus to normal. Fluoride tended to increase rather than decrease plasma phosphate. The increase in plasma magnesium could not be explained by an effect of fluoride on bone magnesium. Fluoride had no effect on the rate of release of magnesium from bone in magnesium-deficient guinea pigs. Fluoride spares magnesium in the guinea pigs and it is postulated to do so by activating a catalyst jointly with magnesium.

Authors' abstract

[7 figures, 2 tables, 13 references]

0.6 (9.6)

The last session dealt with fisheries and estuaries. Six papers were presented: two were related to Venezuela--the status of the fisheries and the biology of the pink-spotted shrimp. Other papers covered stackable fish traps for offshore fishing; pollutants and aquaculture; new ideas in coastal waters in relation to sport and commercial fisheries; and a marine sport fish statistical program.

SW

0.7 DIGESTIBILITY OF PROCESSED FEEDLOT MANURE

Ward, Gerald M., and David K. Beede (Colorado State University, Ft. Collins, Colo.)
Feedstuffs 45, No. 28, 25 (July 9, 1973)

The appearance of larger feedlots for beef production has brought about the problem of disposing of large concentrations of cattle manure. The accumulations of manure are increasing because restrictions by some states have been imposed on the amount and time manure may be used to fertilize land; and commercial fertilizer is considered to be more valuable for crops than manure. To solve the problem, schemes for using manure or fractions of manure in feeds have been proposed.

In one method, manure from penned Hereford steers was used. The manure was mechanically separated into two fractions: (1) a washed, fermented solid fraction of about 50% dry matter, and (2) a fraction representing the residue. The first fraction was evaluated in this study. With the addition of 5% (by weight) dried molasses, the dried material was allowed to ferment in plastic bags for 3 days. The resultant product had the aroma and consistency of good quality corn silage. A digestion trial of the product was conducted with six crossbred lambs, averaging 61 lb in weight, over a 9-day period. No other feed was given. The results indicate that the average dry matter digestibility was 76%, and the average total digestible nutrients were 77 lb per 100 lb of dry feed. The protein intake of the lambs would not support weight gains, but the results show that the lambs maintained weight during the trial. The product was readily eaten by the lambs and it was shown to be highly digestible. In a small-scale trial, cattle on starting feed were found to eat the product readily when fed a conventional starting ration containing corn silage.

[3 tables, 6 references]

SW

0.7 CADMIUM TOXICITY IN GROWING SWINE

Cousins, R. J., A. K. Barber, and J. R. Trout (Rutgers University, State University of New Jersey, New Brunswick, NJ 08903)
Journal of Nutrition 103, No. 7, 964-972 (July 1973)

The purpose of this study was (1) to characterize in growing swine the syndrome manifested by exposure to graded levels of dietary cadmium (2) to quantitate as a function of dose the ability of the tissues of swine to retain cadmium, and (3) to determine the effect of dietary cadmium on the formation of renal cadmium-binding protein.

¹¹⁰Cadmium (Cd) as cadmium chloride was added to the basal diet of 8-week-old swine at levels of 0, 50, 150, 450 and 1,350 p/m for a 6-week comparison period. Growth rate was decreased as a function of Cd level, having ceased in the 1,350 p/m group. Hematocrit values were the most sensitive measurement of toxicity and were decreased in all Cd-fed animals. Serum phosphorus was decreased in animals receiving 450 and 1,350 p/m Cd, while serum calcium was not affected by Cd intake. Bone ash content was decreased as a function of Cd intake. Leucine aminopeptidase (LAP) activity was depressed in renal cortex from the groups receiving 150 p/m Cd or more, but serum LAP was unaffected by Cd intake. The kidney, liver, spleen and teeth contained the highest concentrations of Cd. Kidney Cd increased with dietary Cd level but appeared to reach a near maximal level in the 450 and 1,350 ppm Cd groups. This renal Cd content was directly related to the level of cadmium-binding protein isolated from kidney cortex by gel filtration chromatography. [2 figures, 6 tables, 30 references] [First paragraph of this abstract is an abstract of part of the introduction of the article; the second paragraph is the authors' abstract.]

UNCONVENTIONAL SOURCES OF FISH PROTEIN

0.6 (9.6)

Oiley, June (Tasmanian Reg. Lab., CSIRO, Hobart, Australia)
Chemical Abstracts 78, No. 17, 109336a (Apr. 30, 1973)

0.7 A CONSPPECTUS OF RESEARCH ON CALCIUM REQUIREMENTS OF MAN

Irwin, M. Isabel (Nutrition Institute, Agriculture Research Service, U.S. Dept. of Agriculture, Beltsville, MD 20705), and Eldon W. Kienholz (Dept. of Avian Science, Colorado State University, Fort Collins, CO 80521)
Journal of Nutrition 103, No. 7, 1019-1095 (July 1973)

The purpose of this survey was to show what work has been done, how the work was done, and where the greatest need for research lies. The reports covered by the review have been restricted to those on human studies dealing with the requirements for calcium and with factors affecting those requirements.

The ability of populations in different geographic areas to live in apparent health with widely different calcium intakes makes food intake studies of little value in assessing calcium requirements or calcium nutriture. The studies do indicate the diversity in human subjects and thus point out some of the problems involved in attempting to make estimates of calcium requirements of general applicability. A major impediment to the determination of the calcium requirements for man is the lack of a clear-cut calcium deficiency syndrome. Perhaps more information on calcium metabolism, how it functions in maintaining tonicity of muscles, clotting of the blood, and neural irritability and on how calcium is laid down structurally, might help in devising clinical tests that could indicate calcium nutritional status. Use of isotopic studies with animals may be a logical approach in obtaining the necessary information on calcium nutriture and calcium requirements and in developing the research methods. Much more work is needed on rates and patterns of calcification during childhood in order to accurately assess the

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1.01 (9.4) REVIEW OF FISHERIES IN OECD MEMBER COUNTRIES 1972

Anonymous

Organization for Economic Co-operation and Development, Paris, France (1973), 248 pp. Price \$5.00, £1.76, F20, Sw.fr. 15.60, DM 12.50. Available from OECD sales agents. In the United States: OECD Publications Center, Suite 1207, 1750 Pennsylvania Ave., N.W., Washington, DC 20006.

This report contains brief reviews of the fisheries in 1972 in each of the OECD countries. The country members are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Federal Republic of Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, Turkey, United Kingdom, and United States.

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1.22 (1.014)

NAHRUNGSÖKOLOGISCHE UNTERSUCHUNGEN AN HERINGS-LARVEN
(STUDIES ON FEEDING ECOLOGY OF HERRING LARVAE)

Schnack, Dietrich (Institut für Meereskunde an der Universität Kiel, Kiel, Germany)
Berichte der Deutschen Wissenschaftlichen Kommission für Meeresforschung 22, No. 3 (1972) (Hamburg, Germany)

Studies of the gut content of herring larvae, taken from the northwestern North Sea (Aberdeen Bank) and the Schlei Fjord (Western Baltic Sea), were conducted to compare feeding conditions in these two nursery areas. In addition, studies were conducted on the food supply and the vertical distribution of the larvae.

The results indicate that the North Sea area larvae had a high rate of starvation, as suggested by estimates of digestion rate and food requirements. In comparison, optimal feeding conditions were found in the Schlei Fjord in May but not June. Furthermore, the food supply was found to be optimal at about 200 food organisms of preferred size per liter. Concentrations above or below this level caused a reduction in the amount of food found in the herring larvae.

The vertical distribution of herring larvae was found to be dependent on light and temperature but not on the distribution of plankton. Selection of food organisms by the herring larvae was dependent on size or visibility of the prey. Efficiency of feeding may be reduced by selection of less digestible organisms such as gastropods and nauplii.

[31 figures, 15 tables, 131 references]

SW

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2.00 POSTMORTEM QUALITY CHANGES IN ICED PACIFIC SHRIMP
(PANDALUS JORDANI)

Flores, Sergio C., and David L. Crawford (Dept. of Food Science and Technology, Oregon State University Seafoods Laboratory, Astoria, OR 97103)
Journal of Food Science 38, No. 4, 575-579 (May-June 1973)

Considerable work has already been carried out on the quality changes that take place in ice-stored Gulf of Mexico shrimp. The present study, therefore, was carried out with Pacific shrimp and involved the determination of the postmortem biochemical changes that take place in stored iced Pacific shrimp and an evaluation of the relationship between these changes and the quality of the cooked product. Freshly caught shrimp were held in ice in a storage room kept at 1°-2° C. Samples for testing were taken at the beginning of the experiment and on each of the 8 days of the test period. The shrimp were analyzed for pH, microbial numbers, total and nonprotein nitrogen, tyrosine content, carotenoid pigment content, proteolytic and polyphenolase enzyme activities, and levels of trimethylamine oxide, trimethylamine, dimethylamine, and formaldehyde. Apparently, the chemical changes were mediated by a combination of bacterial action and endogenous enzyme activity, although the washing action of melting ice could have played a major role. Flavor of the cooked shrimp decreased progressively over the 8-day period. The dimethylamine and formaldehyde levels of the shrimp progressively increased during the storage period.

[4 figures, 2 tables, 47 references]

FTP

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0.7
(9.6)

WORLD REVIEW OF NUTRITION AND DIETETICS, VOL 16,
FOOD, NUTRITION AND HEALTH

Rehcgil, M. (editor)

Published by Albert J. Phiebig, Inc., U.S. Representative of S. Karger, P.O. Box
352, White Plains, NY 10602 (1973), 511 pp. Price \$55.80.
Paul A. Lachance (Dept. of Food Science, Rutgers University) (reviewer)
Food Technology 21, No. 8, 78-79 (Aug. 1973)

This comprehensive treatise on nutrition should be useful to the food tech-
nologist knowledgeable in nutrition. The various chapters were written by author-
ities in their fields. The subjects of the chapters are: "Nutrition in Early
Childhood"; "Nutrition During Pregnancy"; "Nutrition and Aging . . ."; "Nutrition
and Physical Performance"; "Nutrition and Behavior and Learning"; "Nutrition and
Disease"; "Undernutrition"; "Overnutrition"; "Nutrition and Infection"; "Nutrition
and Oral Problems"; "Prospects for Improving World Food Supplies and Nutrition";
"Food Habits, Food Faddism, and Nutrition"; "Nutrition in Food Processing"; "Food
Additives"; "Food Safety and Food Poisoning"; and "Reviews Relating to Food, Nutri-
tion and Health." FTP

0.7

calcium requirements for growth. Little information is available on the physio-
logical changes that take place during puberty, pregnancy, lactation, and meno-
pause. Much more information is needed on causative factors and on the metabolic
and physiological changes involved in osteoporosis. Also, information is needed
on the availability and utilization of calcium from diets eaten in areas where
milk is not customarily consumed.

[527 references, 5 appendix tables]

FTP

Chemical Abstracts 78, No. 11, 70428e (Mar. 19, 1973)

Khrisioferzen, G. S., and E. N. Butenko (Azovo-Chernomorsk. Nauchno-Issled. Inst.
Morsk. Rybn. Khoz. Okeanogr., U.S.S.R.)
EFFECT OF SOME TECHNOLOGICAL FACTORS ON THE COLOR OF TOMATO
SAUCE IN CANNED FISH PRODUCTS
(3.3)

0.6

2.01
(0.5)

IDENTIFICATION AND CHARACTERIZATION OF THE MICROFLORA AND
SPOILAGE BACTERIA IN FRESHWATER CRAYFISH PROCAMBARUS GLARKII
(GIRARD)

Cox, N. A., and R. T. Lovell (Dept. of Food Science, Louisiana State University,
Baton Rouge, LA 70803)
Journal of Food Science 38, No. 4, 679-681 (May-June 1973)

Freshwater crayfish are now an important food product in south Louisiana and
other gulf coast areas. They are marketed as chilled peeled tails. The purpose
of the present study was to identify the bacteria present on commercially peeled
crayfish tails after various periods of chilled storage, and then to determine
which bacteria are responsible for spoilage of the crayfish meat. Crayfish tails
were obtained from two commercial plants in south Louisiana; one lot was stored at
0° C and the other at 5° C. At the beginning and after various periods of storage
up to 24 days, bacteria were isolated from the peeled tail meats, identified gen-
erically, and subsequently classified on the basis of their ability to produce
spoilage characteristics in sterile crayfish tail meat. The predominant species
of microorganisms in the fresh crayfish tail meat were Micrococcus, Staphylococcus,
Alcaligenes, and Achromobacter. Species of Achromobacter were predominant during
early storage of the crayfish tails, and species of Pseudomonas and Achromobacter
were predominant in the spoiled flesh. Two hundred bacterial isolates were made;
of these, 22.1% were classified as "rapid spoilers", 16.4% were "slow spoilers",
and 61.5% were considered "nonspoilers." Most of the organisms classified as spoil-
ers were species of Pseudomonas, but some species of Achromobacter also belonged to
this group. [5 tables, 12 references]

FTP

1.0161

WSTEPNA ANALIZA SKŁADU I WYSTĘPOWANIA PRZYŻYWU NIERYBNEGO
UŻYTKOWEGO NA ŁOWISKACH AFRYKAŃSKICH W ROKU 1971
[PRELIMINARY STUDIES ON THE COMPOSITION AND OCCURRENCE
OF USEFUL NON-FISH CATCHES ON THE AFRICAN FISHING GROUNDS
IN 1971]

Seidler, Wiesław (Zespół Wiedzy Rybackiej)
Zeszyty Naukowe, No. 1, 131-144 (Feb. 1973) (Wyższa Szkoła Morska w Szczecin,
Poland) [In Polish; English summary]

Cephalopods constituted the primary components of the nonfish catches by
Polish vessels operating from the Cap Blanc area in 1971; they amounted to about
0.3 to 0.4% of the total catch. Small amounts of crustaceans, dolphins, tortoises,
and snails were also caught. The Polish catch of cephalopods amounts to about
200-300 tons per year and their commercial utilization may be possible.
[4 figures, 1 table, 6 references]

FTP

2.05 EFFECT OF TEMPERATURE ON VIBRIO PARAHAEVOLYTICUS IN OYSTERS
AT REFRIGERATOR AND DEEP FREEZE TEMPERATURES

Thomson, W. K., and C. L. Thacker (Health Protection Branch, Dept. of National Health and Welfare, Ottawa, Ontario, Canada)
Canadian Institute of Food Science and Technology Journal 6, No. 3, 156-158 (July 1973)

V. parahaevoliticus, a microorganism that causes food poisoning, has been isolated from shellfish and other marine sources. Another report indicated that 22% of shellfish sampled from Canadian Atlantic coastal areas contained this microorganism. Earlier reports indicated that the organism could not survive temperatures ranging between -18° and -34° C. An investigation was performed to determine the viability of the microorganism at -20° C.

Three strains of V. parahaevoliticus were used in the study: strain K4, strain Yanagisawa from a human patient, and strain T249 isolated from shellfish. The media used in the study included: (1) homogenized shucked oysters, (2) homogenized oyster-NaCl-peptone, and (3) NaCl-peptone without oysters. The media were sterilized by gamma irradiation (2.5 megrads) after being tubed. About 5 x 10⁴ cells of each actively growing strain of V. parahaevoliticus were inoculated in each set of media; two tubes of each set were incubated at 0°, 4°, 8°, 10°, 12°, and -20° C. Survival of the strains was determined for each temperature by counting colonies on bromothymol blue Teepol agar-plated at the time of inoculation of the tubes and at weekly intervals. Frozen cultures were thawed, diluted serially tenfold, and plated in triplicate.

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2.05 SALMONELLA AND THE FOOD INDUSTRY--METHODS OF ISOLATION,
(0.5) IDENTIFICATION, AND ENUMERATION

Litchfield, John H. (Battelle-Columbus Laboratories, Columbus, Ohio)
Critical Reviews in Food Technology 3, No. 4, 415-456 (June 1973)

Salmonella organisms are frequently found in food products of animal origin; turkey and chicken were implicated in 36% of the foodborne outbreaks of salmonellosis reported in 1971. This review contains a discussion of the various procedures and their advantages and limitations for isolating, identifying, and enumerating Salmonella in foods. Also considered are some of the methods for rapid detection of Salmonella (such as enrichment serology and fluorescent antibody techniques). Apparently, none of the rapid methods can be substituted completely for conventional-cultural methods in isolating and identifying Salmonella in foods.

In spite of improvements in the sanitary quality control of foods, outbreaks of salmonellosis attributed to food sources still occur. Under provisions of the Federal Food, Drug, and Cosmetic Act, foods containing Salmonella are considered adulterated. Thus, the food industry must determine the presence of Salmonella in raw materials and finished products rapidly and economically, and with a high degree of reliability. The final results depend upon the selection of suitable samples from a lot that will assure a high probability of detecting Salmonella if they are present. From a statistical standpoint, attributes or variables sampling plans should be used to assure proper selection of samples. Samples must be subdivided and dispersed in the diluent to break up clumps of food (that may trap Salmonella) without reducing the viability of the organism.

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2.06 SMOOTH, WHITE SPREAD FROM SEPARATED FISH FLESH
FORMS A BASE FOR FLAVORED DIPS, SNACK ITEMS

Patashnik, M., G. Kudo, and D. Miyauchi (National Marine Fisheries Service, NOAA, Pacific Fishery Products Technology Center, Seattle, WA 98102)
Food Product Development 7, No. 6, 82, 87, 89, 91 (July-Aug. 1973)

Using black rockfish (Sebastes flavidus and S. brevispinis), a bland, unflavored fish spread base was produced that had a smooth texture, appealing white color, and excellent stability. The meat is removed from the fish or fish trimmings by means of a commercial fish-flesh separator. The fish spread base formulation is shown in the table that follows. Approved food additives may be used to enhance or modify the flavor of the base. With slight modification of the ingredients the base may be used to prepare dips or fried snack items. Scallop-flavored spread may be prepared by adding 0.3 parts of commercial scallop flavor, 2.1 parts sugar, and 0.0065 parts dimethylsulfide, and subtracting 2.4 parts of fish flesh from the base ingredients. Chive-flavored spread may be prepared by adding 0.25 parts freeze-dried chives and subtracting 0.3 parts of water from the base formulation. Smoke-flavored spread may be prepared by adding 0.0022 parts rose-pink food-grade dye, 0.06 parts paprika, 0.25 parts tomato paste, 0.22 parts liquid smoke, and 0.10 parts meat flavor intensifier, and subtracting 1.55 parts of water from the base formulation. The spreads are heat pasteurized (by use of steam or water at 185° F so that the product in the container's slowest heating point is 180° F for at least 30 min).

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2.06 CRUSTACEAN PROCESSING
(2.3)

Taiyo Fishery Co. Ltd. (pat.)
Japanese Patent 73/0060
Food Technology 27, No. 8, 82 (Aug. 1973)

The extract liquor from crustaceans (such as lobsters) is concentrated at low pH and reduced pressure to prepare a product useful for soup bases. FTP

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2.05 (0.5)

The author states that the conventional procedures of the Food and Drug Administration and the Association of Official Analytical Chemists give the greatest certainty of isolation and identification of *Salmonella* in food. He points out the need, for economic reasons, for the development of greater automation in *Salmonella* methodology and greater sensitivity of detection of small numbers; progress so far in these areas has been slow.

[13 tables, 261 references]

FTP

2.06 BEEFISH PATTIES

King, Frederick J. (National Marine Fisheries Service, Fishery Products Technology Center, Gloucester, MA 01930), and George J. Flick
Marine Fisheries Review 35, No. 7, 31-33 (July 1973)

At present, ground meat can be obtained from fish frames or headed, gutted fish but it is underutilized in existing seafood products. Trying a different approach, we mixed it with ground beef and seasoning, in varying proportions, to make beefish patties.

Sensory evaluations indicated that beefish patties are just as acceptable as all-beef patties in appearance, odor, flavor and texture. Economic and nutritional considerations were not part of these evaluations but these factors would influence final consumer acceptance. The potential value of this new product suggests the desirability of expanding further development work.

[1 figure, 2 tables, 3 references]

Authors' abstract

2.05 (0.5)

The three strains in the three media at 0°, 4°, and -20° C showed none or few viable cells after 2 weeks. The few viable cells were found most often in the 3% NaCl-peptone medium. This suggested that the undiluted homogenized oyster was a less nutritious substrate for the organism than NaCl-peptone. At 8° C, multiplication of all strains did not occur in homogenized oyster medium; however, multiplication occurred in the two other media.

The authors suggest that freezing might be a useful method to reduce the numbers of cells in contaminated oysters. In addition, oysters may be stored safely by refrigeration at 0° to 8° C, particularly if they are to be consumed raw. Storage of oysters contaminated with *V. parahaemolyticus* in refrigerators having temperatures of 10° or 12° C could be hazardous (if they are to be consumed raw).

[4 tables, 11 references]

SW

2.06

Ingredients of fish spread base		Amount of ingredient in percent to prepare pasteurized fish spread
Item	Function of item	
Fish flesh, finely minced	Nutritional base, emulsifier, and texture	65.0
Oil	Texture, lubricity, whiteness, carrier for surfactants	18.0
Water	Spreadability, texture	8.0
Phosphate-modified starch	Freeze-thaw syneresis, texture	5.0
Corn syrup solids	Texture, flavor	2.0
Salt	Solubilize protein, texture, and flavor	1.1
Monosodium glutamate	Flavor intensifier	0.5
Sodium tripolyphosphate	Water-holding capacity	0.15
Potassium sorbate	Mold inhibitor	0.10
Ribotide ¹	Flavor enhancer	0.05
Span 80	Lipophilic surfactant	0.035
Tween 80	Hydrophilic surfactant	0.035
Papain	Spreadability, texture	0.003

¹ 1:1 mixture of disodium inosinate and disodium guanylate.

[1 figure, 3 tables, 4 references]

FTP

2. 112 (2. 1471) AN EFFECTIVE COMBINATION TRAWL FOR WEST COAST DRAGGERS: ATLANTIC-WESTERN TRAWLS Fisher, R. Barry (Dept. of Fisheries and Wildlife, Oregon State University) Station Bulletin 613, Agricultural Experiment Station, Oregon State University, Corvallis, Oreg. (July 1972), 24 pp. A combination trawl that can harvest flatfish and roundfish is needed for otter trawlers. In this bulletin, the author describes the modification, rigging, and fishing of a combination otter trawl on the coast of Oregon by several otter trawlers. The trawls were designed by Wes Johnson (Industrial Development Service, Dept. of Forestry and Fisheries, Ottawa, Ontario, Canada) and were modified and rigged by Fred Anderson (Fishing vessel Betty A, Charleston, Oreg.) and the author. The trawls used were four-seam box trawls with considerable overhang or apron. They were made of polyethylene webbing. The author found by experience that the trawls were superior to the traditional trawls currently used by Oregon druggers. The appendices show the plan and details of the otter trawls. [2 figures, 9 appendices] FTP	2. 1121 TRAWLING NET Golubev, V. A., V. V. Maksimov, P. T. Mikhailov et al. ("Murmanseld" Herring Fleet Control of North Basin Fishing Ind. (pat.) U.S.S.R. Patent 354,822 Soviet Inventions Illustrated (Derivent Publications Ltd., Rochdale House, 128 Theobalds Rd., London WC1 XRP, England), Section III. Mechanical & General, May Week IV, pp. x2-x3 (July 12, 1973) The upper and lower wings of the trawl are arranged so that they respond the same as the mouth sections on which they are mounted and thus help increase the opening of the mouth of the net. This operation is achieved by the use of an assembly of strips of net, the mesh decreasing as the net narrows. FTP
2. 1121 SCIENTISTS MONITOR SOUNDS OF VESSELS AND GEAR Anonymous Fishing News International 12, No. 5, 47-48 (May 1973) Research workers are engaged in a program of investigating noises produced by fishing vessels and their gear. The effects these sounds have on fish behavior is included in the studies. This work is being performed by members of the staff of the Marine Fishing Laboratory of the Department of Agriculture and Fisheries, Aberdeen, Scotland. As a part of the program, experiments were performed to compare the noises produced by two trawlers under free running and trawling conditions. Trawler A was owned by a company which felt that the noises made by its trawlers were responsible for a lower catch rate than ships belonging to a rival company owning trawler B. The trawlers were similar in size and design. The major difference was in their propulsion systems. Trawler A had a direct drive between engine and propeller, and it was powered by a five-cylinder, two-stroke engine developing 950 bhp at 260 r/min. The propeller was four-bladed, 7 ft 7 in by 5 ft 4 in, and fixed pitch; it rotated at 205 r/min when towing. Trawler B had a reduction gearbox between the engine and propeller, and it was powered by a seven-cylinder, four-stroke engine developing 705 bhp at 430 r/min. The propeller was 9 ft by 8.29 ft, and it rotated at 143 r/min when towing. The acoustic range consisted of five hydrophones laid on the seabed. The research vessel Glupea (anchored adjacent to the range) had instruments that were connected to the hydrophones. The trawlers, one at a time, steamed a course over the range. The sounds they made were recorded by the equipment on the Glupea. Sounds produced while free running and while towing gear were recorded. To the	MARINE FISHERIES ABSTRACTS VOL. 26 NO. 10 PAGE 13
2. 113 PORASTANIE STATKÓW RYBACKICH W WARUNKACH ŁOWISK AFRYKAŃSKICH [MARINE FOULING OF FISHING VESSELS ON THE AFRICAN FISHING GROUNDS] Seidler, Wiesław (Zespół Wiedzy Rybackiej) Zeszyty Naukowe No. 1, 117-130 (Feb. 1973) (Wyższa Szkoła Morska w Szczecinie, Poland) [in Polish; English summary] Divers using SCUBA techniques examined the marine fouling of Polish fishing vessels operating off the African coast. The study was conducted during the course of five fishing cruises during 1969 to 1972, including a stay of 73 days at Las Palmas. Fouling occurred during the whole year with the most extensive growth appearing in the summer months. The primary organisms involved were Cirripedia, Thoracica, and algae. [2 figures, 2 illustrations, 2 tables, 5 references] FTP	MARINE FISHERIES ABSTRACTS VOL. 26 NO. 10 PAGE 13

2.1121

unaided ear, both ships radiated noises characteristic of diesel engines and propellers. A secondary modulation of propeller noise was detected which indicated that one propeller blade was noisier than the others for both vessels. Trawler A produced cavitation noise that predominated over engine noise in free running and towing--due possibly to higher revolutions per minute than trawler B. With trawler B, engine noise was more audible and a whining noise, originating in the gearbox, could be heard in free running. Towing the trawl required increasing engine r/min which caused cavitation noise that masked the whining noise. In subjective terms, trawler A appeared to be noisier than trawler B because the noise was pulsed--trawler B noise was smoother. Trawler A was noisier at frequencies between 70 and 200 Hz. This range partly coincides with the frequencies at which cod and haddock are known to be most sensitive, but the steadiness of sounds produced has more effect on fish behavior than differences in amplitude.

SW

2.112 (9.9)

FAO CATALOGUE OF FISHING GEAR DESIGNS

Anonymous

FAO/Fishing News (Books) Ltd. (Unipub, Box 433, New York, NY 10016) (1973), 155 pp.
Price \$13.00. (In English, French, and Spanish)

This book contains designs and specifications for trawls, Danish seines, lampara, purse seines, lift nets, the stow net, gill nets and tangle nets, pots, dredges and seines. Also listed are synthetic fibers, common netting yarns, and ropes.

NS

2.111 POLY(VINYL CHLORIDE) COMPOSITIONS WITH HIGH DENSITY

Hosaka, Shoichi, Jun Izeki, and Nakajiro Yoshida (Shin-Etsu Chemical Industry Co., Ltd.) (pat.)

Japan, Kokai 73 08332

Chemical Abstracts 78, No. 24, 148642s (June 18, 1973)

2.114

REFRIGERATION SYSTEMS ON SMALLER FISHING VESSELS

Ronning, John P. (Clover Park Vocational Technical Institute, Tacoma, Wash.)
Clover Park Vocational Technical Institute Publication, Tacoma, Wash. (n.d.), 17 pp

The author prepared this publication to help North Pacific commercial fishermen achieve a better understanding of the suitability and use of refrigeration equipment to hold and to freeze their catch aboard the fishing vessel. This publication contains some general information and useful guidelines. Thus, the fisherman can be better prepared to make use of other available technical information and to discuss his needs for refrigeration equipment with other fishermen and with equipment suppliers. This bulletin covers the following topics: Refrigeration equipment considerations; Type of fishing operation and product; Matching vessel vessel refrigeration systems (pipe coils for holding and freezing; cold plates for holding and freezing; air blast for holding and freezing, sea water/brine immersion chillers for holding and freezing, and brine spray for freezing); and Sources of information.

[2 figures, 1 table, 6 references]

FTP

2.1125

PURSE SEINE

Karetnikov, A. M. Azov-Black Sea Basin Constr. Techn. Bur. (pat.)

U.S.S.R. Patent 354,823

Soviet Inventions Illustrated, Section III. Mechanical & General, May Week IV,
p. x3 (July 12, 1973)

To facilitate the entry of deep-sea fish into the sack net, two plates of trapezoidal form and with the side edges interconnected are fitted to the seine.

FTP

2.1129 HARPOON HEAD FOR UNDERWATER HUNTING GUNS

Lagutin, O. V., and A. L. Lugovenko (pat.)

U.S.S.R. Patent 351,510

Soviet Inventions Illustrated, Section III. Mechanical & General, May Week II,
p. x5 (July 5, 1973)

The harpoon head is equipped with a stopper catch which improves the usefulness of the hunting gun.

FTP

2.114 HYDRAULIC FISHING MACHINERY SYSTEMS FOR OUTBOARD MOTOR-POWERED BOATS

Fisher, R. Barry, and Charles A. Marshall (Oregon State University) Station Bulletin 608, Agricultural Experiment Station, Oregon State University, Corvallis, Oreg. (Nov. 1971), 40 pp.

Outboard motor-driven vessels are used in gill net salmon fishing in Alaska. Pacific Northwest trawling, bay scallop dredging in New England, inshore hook and line fishing, and pot fishing in southeastern United States. Outboard motors offer the advantage of speed, low initial cost, and ease of maintenance and service. Nevertheless, use of outboard motor propulsion has been limited in certain fisheries because of the inability to secure a power takeoff system from the outboard motor. Such systems could be used to propel troll salmon gurdies, line haulers for longline trawl and pot fishing, line pullers for surface trolling, and pull net lifters and reels. Use of adequate mechanical power would help improve fishing capability and, eventually, increase productivity. The purpose of the present study was to design a reliable, inexpensive, and effective power takeoff system from the outboard motor. Five dories (20-22 feet) with outboard motors equipped with hydraulic power takeoff and gurdies were rigged and fished as trollers for salmon. Five different motors were used with horsepower ranging from 50 to 70. Four of the motors used a direct drive in-line flexible coupling mounted axially between the flywheel and pump shaft; one engine hydraulic power takeoff consisted of a belt and pulley system. The five dories logged a total

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2.116 THE DETECTION OF FISH

Cushing D. H. (Ministry of Agriculture, Fisheries and Food, Fisheries Laboratory, Lowestoft, England)
Pergamon Press Inc., Maxwell House, Fairview Park, Elmsford, NY 10523 (June 1973), 220 pp. Price \$16.50, £5.50.
Deep-Sea Research 20, No. 5, 1 (May 1973)

This book contains a description of the basic acoustic techniques for locating fish and for distinguishing different species of fish and other undersea objects. Estimating the abundance of fish from the echo traces is discussed, and the use of frequency modulation, side scan, and sector scanning sonar systems is considered.

MARINE FISHERIES ABSTRACTS VOL. 26 NO. 10 PAGE 15

2.117 'CO-ANYWHERE' FACTORY-FREEZER JOINS HULL FLEET (2.114)(2.118)

Anonymous
World Fishing 22, No. 5, 14-16 (May 1973)

The first of a pair of stern trawlers to be used in the British deep-sea fleet has been delivered to her owners at Hull, England. The new ship, the Danc, is 74.10 m (243 ft) long and is powered by a 3,246-bhp engine that delivers 2,300 shaft hp at 525 r/pm to a nozzle, variable pitch propeller. The engine also delivers, through a gearbox, power for an alternator and a generator, hydraulic pumps, and other auxiliaries. A shaft torque meter may be used to match propeller pitch to engine output. For safety and crew comfort, bilge keels and roll reduction tanks have been installed. The engine exhaust passes through the bilge must to reduce ice collection on the superstructure. Six tons of fresh water may be produced per day, and another boiler provides steam for heating and deicing. Fire-resistant materials are used in the living quarters, and fire protection is provided by sprinkler and CO₂ systems. There are three control positions on the raised bridge including one in the wheelhouse; in addition, the deck is in clear view from the rear of the wheelhouse. The hull of the Danc has been strengthened for resisting ice, and living spaces have a ventilation system that can be air conditioned for hot climates. Frozen fillets can be produced in horizontal plate freezers or whole fish blocks in vertical plate freezers. The refrigerated fish room has 531 m³ (18,770 cu ft) of space. The fishmeal plant has a capacity of 30 tons per day, and the vessel has a fishmeal storage space of 319 m³ (11,264 cu ft).

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2.1476

DIRECT ESTIMATES OF GILLNET SELECTIVITY TO WALLEYE (STIZOSTEDION VITREUM VITREUM)

Hamley, John M., and Henry A. Regier (Dept. of Zoology, University of Toronto, Toronto 5, Ontario, Canada)
Journal of the Fisheries Research Board of Canada 30, No. 6, 817-830 (June 1973)

Selectivity of gill nets is ordinarily determined "indirectly" by comparing catches with two or more mesh sizes, assuming that the selectivity curves for all the meshes have the same shape and amplitude. In the present study, the authors estimated the selectivity of gill nets by recapturing marked walleye using a mesh of 1 1/2-4 1/2 inches. The selectivity curves obtained were bimodal; but, each could be resolved into two unimodal components representing fish caught by wedging and by tangling. The authors fitted the selectivity of each mesh to a pair of Pearson's Type I curves; as mesh size increased, amplitude of the selectivity curves increased rapidly and tangling occurred over a progressively narrower range of (fish girth)/(mesh perimeter) ratio. Because the assumption of equal amplitudes in the indirect methods is not realistic, the indirect methods overestimate selectivity curves on the left and underestimate them on the right.

[10 figures, 4 tables, 35 references]

FTP

MARINE FISHERIES ABSTRACTS VOL. 26 NO. 10 PAGE 15

2.116 (9.6) MANUAL OF METHODS FOR FISHERIES RESOURCE SURVEY AND APPRAISAL. PART 2. THE USE OF ACOUSTIC INSTRUMENTS FOR FISH DETECTION AND ABUNDANCE ESTIMATION Forbes, S. T. (Marine Laboratory, Aberdeen, Scotland), and O. Nakken (Institute of Marine Research, Bergen, Norway) FAO Manuals in Fisheries Science No. 5, Food and Agriculture Organization of the United Nations, Rome, Italy (1972), 138 pp. Price not given. A preliminary edition of the manual was issued in 1969 as FAO Fisheries Technical Paper No. 83. The present manual has been updated to include the most recent developments and techniques in the use of instruments for fish detection. Sixteen authors from four countries have contributed to include the five main sections of the manual are entitled as follows: "Physical Properties of Sound in Water: Its Propagation and Reflection from Targets"; "The Structure and Functioning of Sonar Equipment"; "The Identification of Targets and Characteristics of Echo Records"; "Abundance Estimation"; and "New Developments in Sonar Techniques." Each section is well illustrated with diagrams and photographs, and there are 87 references. SW	2.117 (2.114) (2.116) 3 GLASS 65-FOOTERS LAUNCHED Anonymous Western Fisheries 86, No. 2, 52, 66, 70 (May 1973) Three fishboat hulls were launched May 1973 in Victoria, British Columbia, Canada. They are made of fiberglass and are 65 feet long with an 18 foot beam. The first, the Pakalot, is a combination halibut longliner and packer. She has a 365-hp diesel engine for main power which drives a 54 x 46 propeller; her speed is calculated at about 11 knots. A 6-cylinder engine provides auxiliary power. The hydraulic powered steering is equipped with automatic pilot. Electronic equipment will include echo sounder, loran navigation capability, radiophone communication, and automatic direction finder. The second hull is for the packer Tamanawas. A Detroit diesel engine, model V12-71, supplies main power, and a model 3-71 diesel engine is for auxiliary power. Hydraulic steering with automatic pilot are also installed. Navigation, communication, and fish finding apparatus include radar, echo sounder, loran radio, radiophone, and direction finder. The Tamanawas has four brine refrigerated holds with a 100-ton capacity. Her accommodations have space for a crew of six. The third hull became the Waterfall for the halibut longline fishery. She has a 365-hp main power diesel engine with a 56 x 46 propeller; auxiliary power is supplied by a 6-cylinder diesel engine. Her steering is hydraulic powered with automatic pilot. Her electronic equipment includes a radar, two echo sounders, two loran radios, an automatic direction finder, a JMW/JFM radiophone and an SSB radiophone. The refrigeration is of the forced air type. [2 photographs] MS
2.114 FISHING GEAR HOIST Nedvigo, N. M., M. I. Poluyanov, V. N. Churunov (Siberian Br. Fishing Fleet Des. Inst.) (pat.) U.S.S.R. Patent 354,825 Soviet Inventions Illustrated, Section III. Mechanical & General, May Week IV, p. x3 (July 12, 1973) This fishing gear hoist consists of a driven drum on a stand; it is capable of greater pulling effort because the angle at which the cable is held by the drum guide is increased. To prevent the running lines of the gear from becoming twisted, a guide is fixed to the stand; the guide is in the form of a spiral coaxial to and running around the outside of the drum. FTP	2.143 (2.1121) TRAWL FOR ELECTRIC FIELD-FISHING Malkavichus, S. K. (Klappeda Branch Fishing Fleet Design Inst.) (pat.) U.S.S.R. Patent 351,509 Soviet Inventions Illustrated, Section III. Mechanical & General, May Week II, p. x5 (July 5, 1973) A system of electrodes permits a reduction in the consumption of energy for the development of the electrical field. FTP MS The Dane is equipped to use the largest pelagic trawl available. The trawl winch has a 200-hp motor with a 200-hp booster motor from the hydraulic system which also powers the net drum. The winch has two main and four auxiliary barrels and holds 2,740 mm (11) of 66-80 mm (3.5 in) circumference warp. Views of the ships decks are and a list of the main suppliers of the ship's equipment is included. [figure 1] MS The Dane is equipped to use the largest pelagic trawl available. The trawl winch has a 200-hp motor with a 200-hp booster motor from the hydraulic system which also powers the net drum. The winch has two main and four auxiliary barrels and holds 2,740 mm (11) of 66-80 mm (3.5 in) circumference warp. Views of the ships decks are and a list of the main suppliers of the ship's equipment is included. [figure 1] MS

2.3 DUNGNESS CRAB MEAT EXTRACTION

Engesser, William F., Viravat Cholvanich, G. Paul Willis, and Terry W. Johnson
Industrial Engineering Station, Oregon State University, Corvallis, OR 97331 (n.d.),
14 pp.

This paper describes a step-by-step method for extracting the meat of Dungeness crab by hand. There are 60 illustrations depicting each step in the crabmeat picking process. This manual, with its illustrations, can be used effectively. A 16-mm sound, color motion-picture film is also available; it describes in considerable detail each movement involved in the picking of crab meat. The motion-picture film may be purchased for about \$200 or may be rented for about \$8.00 per week from the Audio-Visual Dept., Oregon State University.
FTP
[61 illustrations]

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2.3 USE OF OZONE IN SEA WATER FOR CLEANSING SHELLFISH

(1.8)
Anonymous
EffeL. Wat. Treat., J. 12, 260-262 (1972)
Water Pollution Abstracts 45, No. 9, 349, Abstract No. 2108 (Sept. 1972)

The system for cleansing shellfish with preozonized sea water was used at a station on the Mediterranean coast at Sète, France. Results of investigations on the elimination of *Escherichia coli* from the flesh and intravalvular water of the shellfish, and on the amount of ozone required, indicate that the system would be satisfactory on an industrial scale. In addition, the use of ozone has certain advantages over use of chlorine; it has a rapid cleansing action in cases of heavy pollution, and it has no destructive effects on marine plankton.
SW

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2.3 TEXTURED FOOD AND ALLIED PRODUCTS

(9.6)

Gutcho, M. (editor)
Noyes Data Corp., Park Ridge, NJ 07656 (1973), 315 pp. Price \$36.00.
W. J. Wolf (USDA/ARS, Northern Regional Research Laboratory) (reviewer)
Food Technology 27, No. 8, 79-80 (Aug. 1973)

This book contains a summary of the U.S. patent literature on textured foods since 1954. Eighty-two patents are covered (only 15 were issued before 1960) with emphasis on meatlike products. About one-third of the book deals with a step-by-step description of the spun protein fiber process. Another section deals with simulation of meats by alternate techniques (chewy protein gels, expansion, extrusion, and rapid heating of protein slurries under pressure). Still another section considers textured foods such as nutmeats, snack foods, cereals, high-protein spreads, and cheese-like products.
FTP

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2.3 FOOD EXTRUSION

Rossen, Jack L., and Robert C. Miller (Nabisco, Inc., Research Center, Fair Lawn, NJ 07410)
Food Technology 27, No. 8, 46, 48-53 (Aug. 1973)

In the food extrusion process, food material is forced to flow under one or more of a variety of conditions of mixing, heating, and shear, through a die to produce a formed and/or puff-dried product. In this article, the authors describe the types of and applications of extruders used in the food industry; present an idealized model of a single-screw extruder as an aid to analysis of extruder operations; and answer some frequently asked questions about food extruder operations. [5 figures, 2 tables, 3 references]
FTP

MARINE FISHERIES ABSTRACTS VOL. 26 NO. 10 PAGE 17

2.3 (1.81) [PURIFICATION OF MOLLUSCS BY ULTRAVIOLET RADIATION -- PURIFICATION STATION OF OLHAO] DEPURACAO DE MOLUSCOS POR RADIAÇÕES UV -- POSTO DE DEPURACAO DE OLHAO Ferreira, P. S. (Inst. Biol. Marít., Cais do Sodre, Lisboa, 2, Portugal) Bol. Inf. Inst. Biol. Marít. Libs., 4, 8 (1972) Aquatic Sciences & Fisheries Abstracts 2, No. 3, Abstract No. 303035M, 212 (Mar. 1973) Oysters contaminated with <i>Escherichia coli</i> were purified in tanks with a flushing stream of water. To reduce the required time to purify the oysters, the flush water was exposed to UV radiation at about 2537 Å. Tests for <i>E. coli</i> in the oysters and in the effluent water indicated that 36 hr. of flushing was sufficient to provide safe bacterial levels. MS	2.43 (3.238) (3.38) DESIGN FOR DISPOSAL IN FOOD PACKAGING Sacharow, Stanley (Reynolds Metals Co., New York) Food Engineering 45, No. 6, 82-84 (June 1973) The reuse or disposal of packaging materials is one of the questions bothering consumers and packaging technologists. The author suggests that disposal criteria must be integrated into the development of new food packaging. A correct packaging concept may include avoidance of certain materials, elimination of more packing than is necessary, reusable packages, and bulk refill packaging. The disposability of packaging material should be investigated relative to the following characteristics: crushability, waste value, weight, volume, combustibility, and ease of separation from other materials. Numerical, relative values can be assigned to each factor, and, by determining the total value, a rough estimate of the disposability of the packaging material can be made. Increased sales of a product may be realized if the public is informed that the packaging may be disposed of in an ecologically sound manner. Plastics are stable and resist disintegration, but when they are properly disposed of, as in landfill, they are useful. Combustion of plastics in modern equipment may be a new method for generating heat without air pollution. Plastics that can be degraded by bacteria, light, or through water solubility are being investigated. Aluminum and glass containers are currently recycled, but their recycling and use as waste materials can be made more profitable by use of new management. MS
2.3 FISH AND SHELLFISH PROCESSING Fehmerling, G. B.; Ocean Research Corp. (pat.) U.S. Patent 3,729,324 Food Technology 27, No. 8, 82 (Aug. 1973) The fish or shellfish (hard shell removed) is immersed in a solution containing a proteolytic enzyme, a glycoside hydrolase, and a lipolytic enzyme to separate the undesirable tissue. FTF	2.2 SIXTY-ONE FISH (1971) Aug. 28 '82 No. 8, 82 (Aug. 1973) U.S. Patent 3,728,136 Food Technology 27, No. 8, 82 (Aug. 1973) Langlands, I. H.; National Sea Products Ltd. (pat.) U.S. Patent 3,728,136 Food Technology 27, No. 8, 82 (Aug. 1973) Shaped frozen fish FTF
2.3 FISH PROCESSING Wiggins, G. K.; Marine Construction and Design Co. (pat.) Canadian Patent 924,856 Food Technology 27, No. 8, 82 (Aug. 1973) Compressive force is applied to fish to remove milt, roe, and other entrails. FTF	2.3 FISH AND SHELLFISH PROCESSING Fehmerling, G. B.; Ocean Research Corp. (pat.) U.S. Patent 3,729,324 Food Technology 27, No. 8, 82 (Aug. 1973) The fish or shellfish (hard shell removed) is immersed in a solution containing a proteolytic enzyme, a glycoside hydrolase, and a lipolytic enzyme to separate the undesirable tissue. FTF

2.6
(9.2)

PROCEDURE FOR PRODUCT APPROVAL AND PURCHASE:
ARMY AND AIR FORCE EXCHANGE SERVICE

Boies, Henry I., and Richard C. Raulerson (Market Research and Services Division, National Marine Fisheries Service, Southeast Region, St. Petersburg, FL 33701) Marine Fisheries Review 35, No. 7, 15-17 (July 1973)

The Army and Air Force Exchange Service (AAFES) procures food products for use by military installations worldwide, including post exchange (PX) and base exchange (BX) food outlets, but excluding troop feeding, clubs, and commissaries. In 1972 it handled food products valued over \$176 million, including seafood valued over \$1.4 million.

Examples of frozen seafood products currently approved for purchase include: catfish (whole and fillets), clam fingers, cod (fillets, sticks, and cakes), crab cakes, batter-dipped fish (unspecified), flounder portions, haddock portions, halibut (steaks and fillets), scallops, shrimp (breaded, P & D, and tempura), breaded oysters, perch fillets, seabass fillets, seacake (unspecified) and comminuted croaker portions.

Although AAFES represents a fairly large outlet for a diverse number of seafood products at present, it is felt that this market outlet has not been fully developed either in terms of volume or number of products. And a major reason for this is that most potential suppliers lack adequate knowledge of this market. Actually, AAFES is quite flexible in its manner of procurement of supplies and will accept samples and product information from any manufacturer (prime source) or regular dealer. AAFES is desirous of providing on-base military personnel with fine quality products at the best price possible. During each year it observes

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3.5
(2.00)

BACTERIAL COUNTS AND RANCIDITY ESTIMATES OF
STORED QUICK-SALTED FISH CAKES

Del Valle, F. R., J. Hinojosa, D. Barrera, and R. A. De La Mora (School of Marine Sciences & Food Technology, Instituto Tecnológico de Monterrey, Guaymas, Mexico) Journal of Food Science 38, No. 4, 580-582 (May-June 1973)

Previously published reports have described the production of quick-salted fish cakes. The products are quite stable without refrigeration because of their high salt content (about 50%) and low moisture level (about 10%). The present study was carried out to obtain a quantitative measure of the stability of the dried fish cakes. Sun-dried and tunnel dried quick-salted fish cakes (final moisture content about 6-8%) were held without packaging at ambient temperature (35°-40° C) for 3 months. Total plate, halophilic, and staphylococcal bacterial counts were determined on the cakes after 0, 1, 2, and 3 months of storage. Thiobarbituric acid (TBA) levels were also determined at each storage test period on the samples before and after desalting. Desalting was carried out by holding the dried quick-salted fish cakes in boiling water for 5 min. The species of fish used for preparing the cakes were skipjack tuna, mullet, Spanish mackerel, and shark from the Gulf of California.

Microbial contamination of the quick-salted fish cakes did not seem to be high and counts decreased with storage. Bacterial counts depended upon the salt and moisture contents of the cakes. Staphylococci were not found to be present. The different quick-salted fish cakes tend to become rancid to different degrees depending upon the oil content, degree of unsaturation of the oil, drying time for

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3.63
(2.3)

MOLLUSK PROCESSING

Gray, R. D.; Gray Chemical Inc. (pat.) Canadian Patent 923,366 Food Technology 21, No. 8, 82 (Aug. 1973)

The cooked flesh of mollusks are wet milled to produce a homogeneous slurry and then the slurry is dried.

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3.9

PREPARING PICKLED FISH BY FERMENTING A FISH AUTOLYZATE

Gattino, Jean, Albert Hurm, and Georges Lamotte (pat.) French Patent 2,097,637 (Apr. 7, 1972) Chemical Abstracts 67, No. 1, 3008e (Jan. 8, 1973)

3.9
(0.5)
BROWN DISCOLORATION IN FISH JELLY PRODUCTS.
III. VARIOUS CONDITION AFFECTING THE DISCOLORATION
BY TWO SPECIES OF BACTERIA
Fujita, Yatsuka, and Tatsuo Kanayama (Food Addit. Sect. Res. Lab., Ueno Fine Chem. Ind., Ltd., Itami, Japan) Chemical Abstracts 78, No. 23, 146438f (June 11, 1973)

MARINE FISHERIES ABSTRACTS VOL. 26 NO. 10 PAGE 19

(00.2) 5.2

the cakes, presence or absence of hematin pigments, and presence or absence of sunlight when drying the cakes. Some of the rancid components of the quick-salted fish cakes could be removed by the process of desalting in boiling water. Order of preference of the fish cakes by taste panel evaluation varied indirectly with the degree of rancidity of the cakes.

[3 figures, 3 tables, 5 references] FTP

NEW METHODS

(9.6)
11.74

Newman, H. A. I., and Peter E. Braun (compilers)
Journal of Lipid Research 14, No. 3, 373-375 (May 1973)

This is a listing of pertinent references to analytical lipid methods published recently. It lists 78 references. FTP

SHAPED FROZEN FISH PRODUCT

3.235

Oickle, D. E.; National Sea Products Ltd. (pat.)
Canadian Patent 923,367

Food Technology 21, No. 8, 82 (Aug. 1973)

Formed, shaped products are prepared from portions of frozen fish flesh. The individual portions of frozen fish are forced into a forming die cavity. FTP

(2.6) 9.2

and samples hundreds of different food items in order to keep current with the food. The general procedure for arranging first for the procurement of the product, then tested and sampled in it if it is then determined to be helpful. Some selling points of the product are by the vendor and strength to the transaction. If the procurement specialist feels there is a possibility of using the product, it is then tested and sampled in it if it is then determined to be helpful. This procedure takes a minimum of ten days to two weeks. The individual or firm that presented the product is notified, usually by telephone, as to the result, although it is permissible for the vendor to contact AAFES at an earlier date if he wishes.

If the product is found acceptable, temporary procurement authority given and it will be included in the AAFES Food and Expense Supplies Purchase Descriptions, ESM 65-3. This manual is revised and distributed to the various procurement officers, as needed. Even though the product has been accepted and placed in the manual, this does not mean that the procurement officer will use the product.

Before actual purchases of products must meet specifications. Although not necessary, it is helpful if the plant where the product is processed operates under some type of inspection service.

[1] figure

Reprinted in part

DETERMINATION OF POLYUNSATURATED LIPID ACIDS OF MARINE ORGANISMS

4.11

Rzhavskaya, F. M., and T. A. Dubrovskaya (Vses. Nauchno-Issled. Inst. Rybn. Khoz. Okeanogr., Moscow, U.S.S.R.)

Chemical Abstracts 79, No. 3, 16984r (July 23, 1973)

NEW PHYSICAL METHODS IN THE MECHANIZATION OF FISH PROCESSING

(2.3)(2.3)(3.3)(3.3)

Proceedings of the All-Union Research Institute of Marine Fisheries and Oceanography - 17.11.11. No. 11. Translated from Russian, 1972. Published for the National Marine Fisheries Service and the National Science Foundation. Order No. 50131, available from U.S. Dept. of Commerce, National Technical Information Service, Springfield, VA, Price 15122 VA, Price not given.

The traditional fish processing methods involved such principles as osmosis, diffusion, and absorption (salting and smoking), heating and cooling (frying, boiling, sterilization, and freezing), and cutting with a blade (dressing). Fish processing plants will require new methods to increase the yield and reduce costs. An example of the application of new physical methods is the vibro-barreling technique. In the past, medium and large salt fish (herring, cod) were packed in regular rows in barrels and boxes. Attempts at mechanizing this type of packing ended in failure. In 1950 a method was proposed in which the herring were dropped into a vibrating barrel. The herring were packed regularly and densely in this method; the container capacity was increased 4%-6% and manual filling with subsequent mechanical pressing of the pack was eliminated. Improvements to the method involved longitudinal, mixed horizontal-vertical and circular vibrations in a horizontal plane. The introduction of these improvements increased productivity of the labor force in the packing of salt fish by 35%-40%. Other principles involved in better methods for fish processing are ultrasound, hydraulics, hydrodynamics, pneumatics, aerodynamics, photoelectronics, and gamma irradiation.

SW

4.13

PRESENCE OF LIPID-SOLUBLE SELENIUM COMPOUNDS IN MARINE OILS

(0.31) (8.42)

Lunde, Gulbrand (Cent. Inst. Ind. Res., Oslo, Norway)
Chemical Abstracts 78, No. 23, 145425n (June 11, 1973)

FATTY ACIDS OF THE FLESH LIPIDS OF FRESHWATER AND SALTWATER FISH

Reichwald, Irene, and Aike Meizies (Bundesanst. Fettforsch., Muenster/Westfal., Germany)
Chemical Abstracts 78, No. 25, 156838a (June 25, 1973)

MARINE FISHERIES ABSTRACTS VOL. 92 NO. 10 PAGE 21

4.2

OIL OF FISH MEAL. IV. PROPERTIES OF OIL OF WHITE FISH MEAL MANUFACTURED IN THE NORTH PACIFIC

Toyama, Kenzo, Hiroshi Arakawa, and Nobuichiro Okada (Lab. Fish. Ind. Chem., Tokyo Univ. Fish., Tokyo, Japan)
Chemical Abstracts 77, No. 25, 163167p (Dec. 18, 1972)

MARINE FISHERIES ABSTRACTS VOL. 92 NO. 10 PAGE 21

EXTRACTION OF OILS FROM MARINE FISH BY USING VARIOUS SOLVENT SYSTEMS AND THE DETERMINATION OF THE IODINE VALUE OF THE EXTRACTED OILS

Belasingam, M. (Food Technol. Div., Minist. Agric. Fish., Kuala Lumpur, Malay)
Chemical Abstracts 78, No. 3, 13553c (Jan. 22, 1973)

6.31

TRIGLYCERIDE FATTY ACIDS OF SELECTED HIGHER MARINE FUNGI

(4.1)

Block, J. H., P. Catalfomo, and G. H. Constantine, Jr. (School of Pharmacy, Oregon State University, Corvallis, OR 97331)
Mycologia 65, No. 2, 488-491 (Mar.-Apr. 1973)

Higher marine fungi may be important sources of vitamins and other metabolites in marine detritus food webs. To investigate this possibility, experiments were performed to determine the potential of the organisms in supplying triglyceride fatty acids.

Shake cultures of *Corollospora maritima* Werdemann (Ascomycetes) isolate R-19, and *Zalerion maritimum* (Linder) Anastasiou (Fungi Imperfecti) isolate R-6 were grown, harvested, washed, dried, and ground to a powder. The powders were extracted to exhaustion with petroleum ether in a Soxhlet apparatus. Column chromatography was used to separate fatty acids from other materials. Gas chromatography (GC) techniques were used to analyze the components of the fatty acid fraction. Extracts of isolates R-19 and R-6 were found to be identical by thin-layer chromatography and infrared spectrophotometry. On a dry-weight basis isolate R-19 yielded 5.1% triglycerides and R-6 yielded 0.06%. Hydrolysis and GC analyses of the triglycerides showed a mixture of triglycerides containing several major fatty acids in amounts of several others. The fatty acids yield included oleic, palmitic, stearic, and linoleic; lesser amounts of caproic, myristic, palmitoleic, arachidonic, behenic, and linolenic were found. These results indicated that marine and terrestrial higher fungi have similar fatty acids, and they differ from those reported to be found in lower fungi. The oil found in marine Ascomycetes

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6.32

CHEMICAL CHARACTERIZATION OF MUCILAGINOUS POLYSACCHARIDES FROM ULVAEAE SPECIES NATIVE TO THE PUGET SOUND

Medcalf, D. G., C. F. Root, C. L. Craney, D. Mukhopadhyay, C. K. Miller, and W. D. Hopewell (Dept. of Chemistry, University of Puget Sound, Tacoma, Wash.)
Proceedings of the Seventh International Seaweed Symposium, Sapporo, Japan, Aug. 8-12, 1971. University of Tokyo Press (n.d.) pp. 541-547.

As part of a general project to determine the potential for increased utilization of marine polymers, the researchers studied the water-soluble, sulfated polysaccharides from four species of green algae; *Ulva lactuca*, *Enteromorpha compressa*, *E. intestinalis*, and *E. linza*. This paper reports on the chemical composition and structure of these products.

Samples of weeds were collected off Tacoma, Seattle, Cape Alva, and Penrose Point, Wash., in June 1970. The dried weed was extracted with 85% ethanol. The decolorized product was extracted with water at 85°-90° C. The extracts were concentrated and then precipitated with ethanol. The precipitate was dissolved in warm water, dialyzed against distilled water, and freeze dried to produce a "crude polysaccharide." The crude product was treated with α -amylase (to remove starch) and the protein content was reduced by trichloroacetic acid treatment. The dialyzed samples were freeze dried and the resulting polymer products obtained were used in this study.

Polymers from the four species of green algae were composed of D-glucuronic acid, L-rhamnose, and D-xylose, and traces of galactose, glucose, and mannose. The rhamnose:xylose ratio varied from 2.8:1 to 6.2:1. The content of uronic acid ranged from 19% to 22%, and that of sulfate ranged from 12.7% to 19.8%. Apparently,

MARINE FISHERIES ABSTRACTS VOL. 26 NO. 10 PAGE 21

7.3 CRITICAL EVALUATION OF THE AOAC METHOD OF ANALYSIS FOR NITRITE IN MEAT

Nicholas, Rosemary A., and Jay B. Fox, Jr. (Eastern Regional Research Center, Agricultural Research Service, Philadelphia, PA 19118)
Journal of the Association of Official Analytical Chemists **56**, No. 4, 922-925 (July 1973)

The AOAC method (24.014-24.015) for analysis of nitrite in meat products was adopted in 1925 and has remained unchanged since then. In the method, 5 g comminuted meat sample is diluted to about 300 ml in a 500-ml volumetric flask and heated 2 h on a steam bath; 5 ml of saturated mercuric chloride is added, and the flask contents are cooled, diluted to volume, and filtered. An aliquot of the filtrate is added to 2 ml Griess reagent and diluted to 50 ml. (Griess reagent is a mixture of dilute sulfanilic acid and 1-naphthylamine separately dissolved in 15% acetic acid.) Color is allowed to develop for 1 h, then the absorption is measured in a spectrophotometer at 520 nm. The amount of nitrite present is found by comparing the absorption of the sample with that of a standard nitrite curve. The authors critically examined each step of the official method, measured the effects of altering some steps in the procedure, and compared newly proposed methods for reliability with the official method.

Mercuric chloride is used as a precipitant of protein; it also cleaves nitrosohols which, other reports suggest, is important in nitrite analysis. The authors recommend that addition of mercuric chloride be discontinued because prolonged cooking accomplishes the same purposes and also because the compound is

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7.0 THE USE AND EFFECT OF MIXED STANDARDS ON THE QUANTITATION OF POLYCHLORINATED BIPHENYLS

Beezhold, F. Lee, and Virginia F. Stout (National Marine Fisheries Service, Pacific Fishery Products Technology Center, Seattle, Wash.)
Bulletin of Environmental Contamination and Toxicology **10**, No. 1, 10-15 (July 1973)

Although they have been frequently reported as ubiquitous pollutants, the quantitation of PCBs in analytical procedures remains imprecise. Other reports indicated that quantitation of PCBs have been accomplished by either measuring the heights of prominent peaks in gas-liquid chromatograms (GLC) or by measuring the total area of all sample PCB peaks and relating these to the area of GLC peaks yielded by standard PCB mixtures. The authors believe that these procedures do not provide accurate quantitation because of a lack of primary standards of individual PCB components. In addition, the authors found that the GLC peaks were not constant for the various isomers existing in a PCB mixture. The values varied relative to which Aroclor (a PCB) or mixture of Aroclors were used as a standard. Experiments were performed to illustrate the problems in comparing samples containing mixtures of PCBs to a specific Aroclor.

Samples of fish materials were prepared for GLC by solvent extraction and cleanup by elution. Separate standards of Aroclor 1254 and 1260 were prepared; and mixtures of these PCBs were prepared in increments of about 10% Aroclor 1260 in Aroclor 1254. Quantitation of the sample extracts and PCB standards was accomplished by excising the chromatograms and weighing them on an analytical balance. Using this procedure, a curve was prepared which relates the composition of

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7.1 CARBON-13 THE GROWING ORGANIC ISOTOPE

Eck, C. F. (Monsanto Research Corp., Mound Laboratory, Miamisburg, Ohio)
Research/Development **24**, No. 8, 32-38 (Aug. 1973)

Carbon is abundant in nature, in organic and in inorganic substances. Naturally occurring carbon is 98.9% carbon-12 and 1.1% carbon-13. These isotopes are stable and nonradioactive. Up to now carbon-13 enriched to 60% and 90% has been available only at relatively high prices. Recently, however, carbon-13 enriched to 90% became available in relatively large quantities at much lower prices. The availability of low cost carbon-13 and improved instrumentation for detection of carbon-13 in a variety of molecules and concentrations have created considerable interest in its use in studies of organic molecules, enzymes, proteins, and possibly diagnostic and tracer applications. This article contains a brief history of carbon-13, an overview of its separation, production, prices, distribution, usage problems, and some current uses. The current and potential uses for carbon-13 include studies of animal and human metabolism, clinical diagnostic studies, ecology tracers, drug studies and testing, kinetic studies, molecular structure of macromolecules and organic molecules, and organic reaction mechanisms. [5 figures, 2 tables, 83 references]

FTP

MARINE FISHERIES ABSTRACTS VOL 26 NO.10 PAGE 23

7.5 LIQUID CHROMATOGRAPHY OF CARBAMATE PESTICIDES

Thruston, Alfred D., Jr. (Southeast Environmental Research Laboratory, College Station Rd., Athens, GA 30601)
Environmental Protection Technology Series No. EPA-R2-72-079 (Oct. 1972), vii + 15 pp. National Environmental Research Center, U.S. Environmental Protection Agency, Corvallis, OR 97330. For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Price 55 cents.

Most carbamate pesticides cannot be analyzed directly by gas chromatography because they are thermally unstable; the carbamate must first be converted to a suitable derivative. Liquid chromatography (LC) is a technique that provides selectivity and moderate sensitivity for analysis of the heat-labile carbamates.

A commercial liquid chromatograph was evaluated under either of two conditions and columns: (1) a 1 m. x 2 mm. i.d. stainless-steel column packed with Permaphase octadecyl silane (for nonpolar compounds). Mobile phases were 6% and 30% methanol in water. A pressure of 1,000 p.s.i. at 50° C. maintained a flow of 1 ml. per minute; or (2) a 1 m. x 2 mm. i.d. stainless-steel column packed with Permaphase ether (for more polar type carbamates). Mobile phases were hexane, 1% isopropanol/hexane, and 4% isopropanol/hexane. A pressure of 400 p.s.i. at 40° C. maintained a flow of 1 ml. per minute. The retention times and sensitivities for 17 carbamates were determined on Permaphase octadecyl silane; in addition, the chromatograms of seven carbamates were determined on the Permaphase ether column. Most of the carbamates eluted as sharp symmetrical peaks in 10 min.

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(61.6) 7.7

the standard to the 8 paper/ng PCBs. The results of the experiments indicated that the choice of a standard could alter the values yielded by GLC by more than a factor of 2. The authors suggest that the mixture of PCBs used in GLC determinations should be reported along with resulting values.

Chromatograms are given for examples of samples containing mixtures of PCBs that are not comparable to a specific Aroclor.

MS

[3 figures, 1 table, 12 references]

MS

Early, James A., Wilbur D. Shults, and John A. Dean (Anal. Chem. Div., Oak Ridge Natl. Lab., Oak Ridge, Tenn.)

Chemical Abstracts 72, No. 5, 28000e (Aug. 6, 1973)

7.0
EXTRACTION AND GAS CHROMATOGRAPHIC DETERMINATION OF METHYL-, ETHYL-, AND METHOXYETHYLMERCURY(II) HALIDES

(61.6) 7.7

corrosive, toxic, and a pollutant. In the preparation of Griess reagent, commercial grade 1-naphthylamine is used directly. The authors recommend that, because of impurities present, the compound be recrystallized from boiling water and the purified material used instead. In the color-developing step, the authors recommend that the dilution of Griess reagent be decreased from 10:1 to 52:1 and the reaction time be reduced from 10 min. to 5 min. The increased concentration of Griess reagent will provide for the color development of the color development reaction in a shorter time.

In studies to determine the effects of altering the official procedures, a number of compounds were added to the Griess reagent to see if they would benefit the reaction. The results indicated that the compounds had no effect or were less effective than the unmodified reagent.

The official procedure for sample preparation was compared to procedures in the following reports; however, the authors found nothing to recommend any of them over the AOAC method: L. Kamm, G. G. McKeown, and D. M. Smith [JAOAC 48, 892 (1965)], A. Mirna [Proceedings of the 16th European Meeting of Meat Research Workers 1, 689 (1970)], and A. Adriaanse, and J. E. E. Robbers [J. Sci. Food Agr. 20, 321 (1966)].

MS

[3 figures, 2 tables, 11 references]

MS

MS

7.42
(1.12) SIMPLE METHOD FOR THE ACTIVATION ANALYSIS OF MERCURY IN FISH. MERCURY CONTENT IN VENEZUELAN CANNED TUNA

Lukowicz, J. A., F. Montoloy, and M. Heurtelise (Inst. Venez. Invest. Cient., Caracas, Venezuela)

Chemical Abstracts 79, No. 5, 30533f (Aug. 6, 1973)

ATOMIC ABSORPTION SPECTROSCOPIC DETERMINATION OF CADMIUM

(61.6) 7.7

Nakamuro, Katsuhiko, Yasuyoshi Sayato, and Masaharu Tonomura (Eisei Shikensho, Tokyo, Japan)

Chemical Abstracts 78, No. 25, 25, 6773 (June 25, 1973)

7.599
(9.19) SEPARATION AND IDENTIFICATION OF CARBOFURAN, ITS METABOLITES, AND CONJUGATES FOUND IN FISH EXPOSED TO RING CARBON-14-LABELLED CARBOFURAN USING ITC [INSTANT THIN-LAYER CHROMATOGRAPHY] SILICA GEL STRIPS

Bruce, W. N. (Illinois Nat. Hist. Surv., Urbana, Ill.)

Chemical Abstracts 78, No. 11, 70278f (Mar. 19, 1973)

MS
[3 figures, 3 tables, 9 references]

The author concluded that LC shows promise for analysis of carbamate residues because it provides separations with speed and high resolution comparable to those of gas chromatography. A list of chemical names and sources of carbamate pesticides is given; retention times, sensitivities, and chromatograms of the carbamates are also shown.

Ronsivalli, L. J., and Robert J. Learson (National Marine Fisheries Service, NOAA, Atlantic Fishery Products Technology Center, Gloucester, Mass.), and S. E. Charm (New England Enzyme Center, Tufts University School of Medicine, Boston, Mass.)

Marine Fisheries Review 35, No. 7, 34-36 (July 1973)

The slide rule described in this article is based on a publication by S. E. Charm, R. J. Learson, L. J. Ronsivalli, and M. S. Schwartz [Food Technology 26, No. 7, 65-68 (1972)].

According to that publication, the spoilage of cod occurs at a constant rate for any given temperature in the range of 32° F to 46° F. When the spoilage rate constants were plotted versus the temperature, a linear relationship was suggested. Charm et al. also found that when cod filets were stored under conditions of varying temperatures, the spoilage rate constants were unaffected when the sequence of storage temperature was varied.

These findings clearly indicated that a device for predicting the shelf life of cod filets is possible. The slide rule should be useful to anyone concerned with distribution and handling of fresh fish. It emphasizes the advantage of maintaining the product at as low a temperature as possible. The slide rule predicts the quality of fish in terms of "days held in ice."

The slide rule shown in the figure that follows has three parts: (1) the day/temperature (D/T) scale, (2) the shelf life (S) scale, and (3) the index. Note that the temperature lines are horizontal and that the day lines are diagonals.

8. (0.7) SHRIMPS OF KARACHI WATERS. I. DETERMINATION OF FOOD VALUE AND PHYSICO-CHEMICAL CONSTANTS OF FAT AND PROTEIN

Haq, S. A., Iqbal H. Siddiqui, and Shamsuddin Qureshi (Pakistan Council. Sci. Ind. Res. Lab., Karachi, Pakistan)

Chemical Abstracts 78, No. 7, 41741w (Feb. 19, 1973)

Chemical Abstracts 78, No. 1, 939y (Jan. 8, 1973)

8. (8.59) ANALYTICAL PROBLEMS IN AGRICULTURAL SCIENCE

Ivling, George W., Jr., and W. C. Schaefer (Agric. Res. Serv., U.S. Dept. Agric., Washington, D.C.)

Anonymous
Environmental Science & Technology 7, No. 8, 684-686 (Aug. 1973)

This report is based upon papers delivered at the 7th Annual Conference on Trace Substances in Environmental Health held at the University of Missouri recently. The papers emphasized the need for quantitative information on the metal content of the water, food, and air consumed by man and on other sources of metal intake. Acquiring this information will show patterns relating trace metals to human health and disease. The chemical form of metals may be important in toxicity. An example given is methyl mercury which can pass through the blood-brain barrier and cause damage to the central nervous system. Other researchers found that small concentrations of cadmium in rats protected them against mercury intoxication. Pre-treatment of the animals with subtoxic doses of cadmium increased the concentration of metallothionein in the liver and kidneys which enhanced the uptake of mercury by these tissues. However, the mercury was bound to the metallothionein which prevented mercury poisoning of the liver and kidney tissues. Other studies showed that cadmium concentration in human tissues is increased by contacts with cosmetics, cigarettes, galvanized pipes, and ingestion of food grown with synthetic fertilizers. Cadmium has been linked to cancer, kidney ailments, hypertension, and other cardiovascular conditions. In addition, cadmium has been linked to a disease called itai-itai among people who live downstream of a mine in Japan. The cadmium in the drinking water induced a negative calcium balance in the people. In a related study, rats given cadmium in their diets exhibited a loss of calcium from their bones. This condition could be a possible explanation for the disease

8.42 COPPER CONTENT OF FOOD

Pennington, Jean T., and Doris Howes Calloway (Dept. of Nutritional Sciences, University of California, Berkeley, CA 94720)

Journal of the American Dietetic Association 63, No. 2, 143-153 (Aug. 1973)

Data are given on the copper content of foods. Such information is useful in determining the adequacy of copper in our daily diets and in planning copper-restricted diets. The table of data on foods gives information on internal organs (such as animal hearts, kidneys, livers, etc.); muscle meat and meat products; poultry and game muscle; chicken eggs; fish and shellfish; dairy products; prepared dishes; soups; nuts and seeds; fruit and fruit products; vegetables and vegetable products; cereals, cereal products, and starches; and sweets and breads; sweets; condiments, spices, and flavorings; salad dressings, oils, and fats; beverages; alcoholic beverages; baby foods; and miscellaneous items used with foods. Data on the copper content of fish and shellfish are shown in the table that follows.

[1 table, 67 references]

FTP

MINERAL COMPOSITION OF FISH AND NONFISH SEAFOODS

8.42
(6.55)

Leonova, L. I., and S. Castellano (U.S.S.R.),
Chemical Abstracts 78, No. 7, 41796c (Feb. 19, 1973)

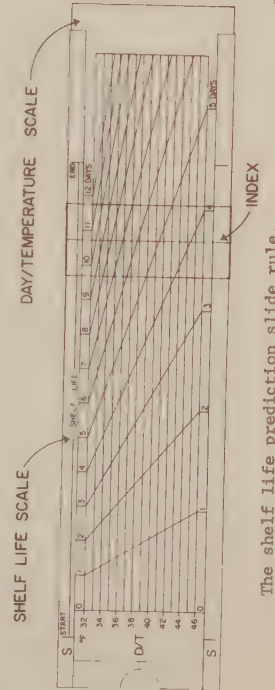
8.42

Food item	Number of samples	Copper content	
		Range	Mean
Catfish	3	14-25	17
Clams	1	00-00	00
Codfish	1	18-22	20
Codfish, steamed or fried	1	07-10	08
Codfish, steamed	1	01-03	02
Flounder	3	27-30	28
Haddock	2	01-25	13
Halibut	5	01-36	19
Shrimp	2	19-15	17
Mackerel	2	26-40	33
Salmon	2	30-34	32
Oysters	2	40-58	49
Salmon, canned	2	14-34	24
Sardines, canned	1	01-06	04
Scallops	1	30-60	45
Shrimp, dried	1	10-18	14
Shrimp, boiled	1	11-20	16
Tuna	1	63-70	67
Whitefish	1	07-16	12

Raw food items unless otherwise indicated.

8.7

The slide rule should only be used when the history of the fish is unknown or can be estimated fairly accurately.
The slide rule was developed with Federal research funds, and there is no restriction as to its use by the public. Anyone having questions or needing assistance in the fabrication of the slide rule is requested to contact the authors at the Atlantic Fishery Products Technology Center, National Marine Fisheries Service, National Oceanic and Atmospheric Administration, U.S. Department of Commerce, Emerson Avenue, Gloucester, Massachusetts 01930.
[1] figure, 3 references



The self prediction slide rule.

8.42

DISTRIBUTION OF CADMIUM IN BIOLOGICAL MATERIALS.
2. CADMIUM AND ZINC CONTENTS OF FOODS

Ishizaki, Atsuhiko, Masaki Fukushima, and Michiko Sakamoto (Sch. Med., Kanazawa Univ., Kanazawa, Japan)
Chemical Abstracts 78, No. 7, 41796c (Feb. 19, 1973)

8.42

ital-ital. Cadmium was also found to depress serum copper and ceruloplasmin (a blue, copper-dependent protein) levels in rats receiving low-level copper diets. Abnormal behavior resulted when given 80% reduced copper in the diet is related to reduced detoxification of ingested chemicals such as aniline and phenobarbital. Molybdenum was found to interfere with copper metabolism; it also decreased calcium release from bone and decreased uptake of calcium. Molybdenum is also a possible environmental contaminant. Other reports described the interactions of zinc, selenium, lead, iron, and manganese.

[3 photographs]

SW

SURVEY OF THE SELENIUM CONTENT OF FISH FROM
49 NEW YORK STATE WATERS

Pakkala, Irene S., Walter H. Guterman, Donald J. Iisk, George E. Burdick, and Earl J. Harris (New York State Coll. Agric. Life Sci., Cornell Univ., Ithaca, N.Y.)
Chemical Abstracts 78, No. 9, 53560z (Mar. 5, 1973)

8.8 (0.5) MICROBIOLOGICAL, CHEMICAL, AND ORGANOLEPTIC CHARACTERISTICS OF FROZEN BREADED RAW SHRIMP Vanderzant, C., A. W. Matthys, and B. F. Cobb III (Animal Science Department Texas A. & M. University, College Station, TX 77843) Journal of Milk and Food Technology 36, No. 5, 253-261 (May 1973) This paper reports data on the bacteriological, chemical, and organoleptic conditions of raw shrimp and plant processed frozen breaded raw shrimp. In addition, data are given on the distribution of the microbial flora of 12 retail samples of frozen raw breaded shrimp. Thirty percent of the raw shrimp received for processing showed bacterial counts in excess of 10⁶/g. Fifty-six percent of the frozen raw breaded shrimp (as processed at the plant) had bacterial counts over 10⁶/g. <i>Salmonella</i> species and <i>Vibrio parahaemolyticus</i> were not isolated from plant processed frozen breaded raw shrimps. The organisms initially present in the frozen breaded raw shrimp were species of <i>Pseudomonas</i>, <i>Achromobacter</i>, <i>Bacillus</i>, <i>Moraxella</i>, <i>Microbacterium</i>, <i>Micrococcus</i>, or <i>Corynebacterium</i>. When the samples were held at 0° to 10° C, the numbers of species of <i>Microbacterium</i>, <i>Micrococcus</i>, <i>Bacillus</i>, or <i>Corynebacterium</i> increased. Apparently, the batter and breading contributed to the large numbers of species of <i>Bacillus</i> and <i>Microbacterium</i>. Fifty-two percent of the retail samples of frozen breaded raw shrimp had aerobic plate counts of 10⁶/g or higher. Gram-positive forms (<i>Bacillus</i>, <i>Microbacterium</i>, and <i>Corynebacterium</i>) were the more predominant in these retail samples. Additional data are given on the trimethylamine, total volatile nitrogen, and odor scores of the various samples. [7 figures, 8 tables, 24 references] FTP MARINE FISHERIES ABSTRACTS VOL. 26 NO.10 PAGE 27	9. BETWEEN COMPLACENCY AND PANIC Handler, Philip, and Alexander Zucker (National Academy of Sciences, Washington, DC 20418) Federation Proceedings 32, No. 7, 1748-1753 (July 1973) The manner in which society addresses the long-term aspects of population control, resource use, energy production, pesticide and fertilizer use, and air and water pollution will have a profound effect on the natural environment. The economic, social, and cultural environment of future generations will also be affected. Few people foresaw the emergence of the "environmental crisis." There is general understanding that environmental effects, subtle, long delayed, and initially unperceptible can hold the threat of severe, perhaps irreversible, consequences. Policy making in the environmental area is very difficult because it requires estimation of second and third order effects, and there is little record of success in such endeavors. The formulation of a national energy policy is now vastly complicated by environmental concerns. The prudent national course is to prepare for alternative sources of energy that may be safer, simpler, and that have no serious environmental effect. In a few years, the costs of developing these new sources of energy and protecting the environment may prove to be as great as the national total of corporate profits. The branches of science that describe large-scale phenomena--a tropical forest, the ozone layer of the stratosphere, the plankton of the sea, or a city of people--need more attention because they hold the answers to environmental strategy. Society may become unwilling to support fundamental biological and physical sciences because of the environmental issues
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9.1 (1.3) BARRIERS TO RANGE EXTENSION OF ATLANTIC AND PACIFIC SALMON IN ARCTIC NORTH AMERICA Saloniuss, P. O. (Canadian Forestry Service, Durham Bridge, RR9, Fredericton, New Brunswick, Canada) Arctic 26, No. 2, 112-122 (June 1973) The enormous potential of subarctic fresh water in the Hudson Bay and Mackenzie drainage areas for the spawning and rearing of anadromous salmon may be worth testing. Successful colonization would provide the basis for new fisheries in both areas. The potential of the Mackenzie drainage system is suggested by the similarities and proximity of spawning and nursery areas now used in Alaska and the Yukon area. Introduction of pink and chum salmon in 1955-56 in southern Hudson Bay and James Bay (an arm of Hudson Bay) was unsuccessful. However, later experience with pink salmon introductions in Newfoundland has developed information which may provide for more successful future introductions in Hudson Bay. If a race of salmon is transferred to a habitat that resembles the location from where it originated, the chances for survival are enhanced. Consequently, the author suggests that Atlantic salmon plantings in Hudson Bay would be more successful than Pacific salmon plantings. Salmon stock originating in the rivers emptying into Ungava Bay would be the logical choice for introduction into the rivers draining the east coast of Hudson and James Bays. The author believes that three Pacific salmon--chinook, sockeye, and coho--would successfully colonize the Mackenzie River system that empties into the Arctic Ocean. The author also suggests that the introductions should be of surface-sterilized, disease-free eggs which are to be hatched in the new areas. Close track of the populations should	MARINE FISHERIES ABSTRACTS VOL. 26 NO.10 PAGE 27 9.12 CHEMICAL BASIS FOR HOMING OF ATLANTIC SALMON (SALMO SALAR) TO A HATCHERY Sutterlin, A. M. (Dept. of Environment, Fisheries Research Board of Canada, Biological Station, St. Andrews, New Brunswick, Canada), and R. Gray Journal of the Fisheries Research Board of Canada 30, No. 7, 985-989 (July 1973) The purpose of this study was to assess the precision of the homing of hatchery-reared Atlantic salmon to the hatchery. The authors determined the return location of hatchery reared and wild Atlantic salmon recovered from fish traps at a hydro-electric dam and at a hatchery 1,500 m downstream of the dam. They found that 97% of the ascending wild salmon returned to the dam and 3% were found at the hatchery site. Sixty-seven percent of the hatchery-reared fish returned to the hatchery and 33% were found at the dam. The nature of the active components responsible for the homing of hatchery fish is not known. In additional tank tests, adults of hatchery-reared fish preferred hatchery effluent over river water; wild fish showed no preference to either water. Hatchery fish and wild fish avoided well water (a component of hatchery effluent). Adding CuSO₄ to hatchery effluent altered its attractiveness to the hatchery salmon. [2 figures, 2 tables, 15 references] FTP MARINE FISHERIES ABSTRACTS VOL. 26 NO.10 PAGE 27
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9.

requiring practical answers. The question of the environment finally becomes a personal matter. What is the individual willing to give up to ensure a healthy environment for himself and the future inhabitants of the planet? The sacrifice may be much more severe if protection of the environment requires an early braking of economic growth. Some social freedom may have to be surrendered to protect the environment. The responsibility of controlling the world ecosystem now rests on man. He must take upon himself functions which formerly were considered to be the prerogatives of nature or Providence.

[6 references]

MS

EFFECT OF ENDOGENOUS FACTORS IN MARINE BIOGEOCHEMISTRY

9. Florovskaya, V. N. (Mosk. Gos. Univ., Moscow, U.S.S.R.)
Chemical Abstracts 79, No. 5, 28676e (Aug. 6, 1973)

216 (9.6)(11.9)

ABYSSAL ENVIRONMENT AND ECOLOGY OF THE WORLD OCEANS

Menzies, Robert J. (Florida State University, Tallahassee, Fla.), Robert Y. George, and Gilbert T. Rowe
John Wiley & Sons, Inc., New York 1973, xxiii + 488 pp. Price not given.

This book of 14 chapters begins with a history of abyssal biological research and its evolution to modern times. In another chapter, the collecting methodology and the preparation of benthic and abyssal specimens are analyzed. Dredges and grab samplers are described and deep bottom trawling techniques are compared for quality of data generated. The authors are more concerned about defining the different fauna living at abyssal depths rather than the physico-chemical conditions or bathymetry. The authors show that species living in the archibenthic or abyssal zones in the tropics emerge toward the continental shelf in the poles. Other species live closer to the surface in the northern climate and submerge to lower depths in lower latitudes of the tropics. In the last part of the book the authors establish the changes that have occurred in the various animal groups throughout geological times. They have proposed a new scheme for the abyssal provinces based upon temperature and bottom topography. The book is well illustrated with figures and photographs; it has an extensive modern bibliography, plus lists of reports from men noted for their work in deep-sea ecology. Also included are reports relating to expeditions from the United States, Netherlands, Sweden, Denmark, and the U.S.S.R. There is an index to genera and species mentioned in the text, a taxonomic index, and an author index.

MS

9.17

PRELIMINARY STANDING STOCK AND BIOMASS ESTIMATES OF SEABIRDS IN THE SUBARCTIC PACIFIC REGION

Sanger, Gerald A. (National Marine Fisheries Service, Northwest Fisheries Center, Seattle, WA 98102)

In Biological Oceanography of the Northern North Pacific Ocean, A. Yositada Takenouti (ed.), published by Idemitsu Shoten, Tokyo, Japan (1972), pp. 499-611

The estimated standing stocks of seabirds in the subarctic Pacific region totaled about 8 million in the winter and 51 million in the summer. The densities of seabirds were highest in the coastal areas, but the greatest number of birds were estimated to be in the central subarctic domain. The family of shearwaters (Procellariidae) were predominant in the summer, and they and the family Laridae (gulls and terns) and Alcidae (auks, murres, and puffins) were common in the winter. Seabirds consume an estimated 0.6 to 1.2 million tons of food per year in the region and excrete about 120,000 to 240,000 tons of feces. In the central subarctic domain, the shearwaters are responsible for 61% of the total intake of food by birds. Local consumption of plankton and nekton (fish and other forms) is increased by the flocking of the seabirds, and flocking causes the dropping of feces in a concentrated area to fertilize the continued production of the plankton and nekton. Very little is known about the distribution, abundance, and movements of seabirds in the region and of their relationship with the pelagic environment. Seabirds are prime candidates for detailed studies of oceanic ecosystems because they can be studied more readily than other forms of life.

MS

[5 figures, 99 tables, 99 references]

(9.1) 16

be maintained until the colony is self sustaining. If commercial and sport fisheries are developed in these remote areas, economic benefits would be gained by the native peoples; in addition, the establishment of the fisheries would influence the care that would have to be taken by the encroaching destructive exploiters of the natural resources.

[2 figures, 33 references]

MS

HYDROCHEMICAL CHARACTERISTICS OF LAKES IN THE INTERFLUVIAL AREA OF THE SHANDRIN AND SUNDRIIN RIVERS

9. Bryukhanov, I. M., and A. A. Shokhireva (U.S.S.R.)
Chemical Abstracts 79, No. 2, 9624v (July 16, 1973)

9.12
(9.6)

PACIFIC MARINE FISHES. BOOK 1

Yasuda, Fujio, and Yoshio Hiyama (Edited by Warren Burgess and Herbert R. Axelrod)
T.F.H. Publications, Inc., New Jersey (1972), 280 pp. Price \$20.00.
Leslie W. Knapp (reviewer)
Transactions of the American Fisheries Society 102, No. 3, 669-670 (July 1973)

This is the first of a proposed series of volumes covering the tropical Pacific marine fishes. It contains 488 color plates of coral reef fishes, mostly from the Ryukyu Islands and adjacent areas of the Western Pacific. It includes representatives of over 40 families of fishes and emphasizes the Pomacanthidae, Chaetodontidae, and Pomacentridae. The reviewer believes the series should be of interest to layman and ichthyologists because of the excellent color photographs. FTP

MARINE FISHERIES ABSTRACTS VOL. 26 NO. 10 PAGE 29

9.12
(0.119)(2.116)

SONIC TAGS ATTACHED TO ALASKA KING CRAB

Monan, Gerald E., and Donald L. Thorne (National Marine Fisheries Service, Northwest Fisheries Center, Seattle, WA 98112)
Marine Fisheries Review 35, No. 7, 18-21 (July 1973)

A system for monitoring the location and movement of free-moving Alaska king crab in their natural environment is described. The sonic tag and related ultrasonic tracking equipment were used on crab in the Bering Sea near Unalaska, Alaska. Feasibility tests indicated the system appears to be a feasible tool for aiding in the harvest and management of king crab.
[3 figures, 1 table, 6 references]

Authors' abstract

MARINE FISHERIES ABSTRACTS VOL. 26 NO. 10 PAGE 29

9.15
(1.85)

A NEW FUNGUS DISEASE OF THE WHITE SHRIMP PENAEUS SETIFERUS

Lightner, D. V., and C. T. Fontaine (National Marine Fisheries Service, Gulf Coastal Fisheries Center, Galveston, TX 77550)
Journal of Invertebrate Pathology 22, No. 1, 94-99 (July 1973)

The presence of the disease first became apparent in larval shrimp in the second protozoal stage and disappeared as the shrimp reached the first mysis stage. The disease is caused by a species of Lagenidium. The fungal mycelium (vegetative part of a fungus) gradually invaded and replaced the tissues within the larval shrimp. The thorax, abdomen, eye stalks, and the swimming appendages of the larvae were filled with the hyphae (filamentous parts of mycelium) of the fungus. The destruction of tissue immobilized the larval shrimp. The hyphae were irregular and branched, and yellow green in color with many round, refractive oil droplets. Sporogenesis began after the larval shrimp were immobilized. Growth of the fungus was slow and limited in thioglycolate medium. The fungus grew rapidly on Sabouraud dextrose agar enriched with 2% salt and shrimp homogenate when incubated for 4-5 days at 27° C. In Sabouraud broth the hyphae of the fungus appeared similar to those observed in the shrimp larvae. Forty-eight h after the disease began and the remaining larvae reached the first mysis stage, mortality stopped and all indications of disease disappeared. The infection was limited to one tank in the laboratory and mortality reached 12.4%. The fungus was also infective to larval brown shrimp, P. aztecus.
[10 figures, 9 references]

SW

MARINE FISHERIES ABSTRACTS VOL. 26 NO. 10 PAGE 29

9.16

OBSERVED LIVER CHANGES IN RAINBOW TROUT (SALMO GAIRDNERI) FED VARYING LEVELS OF A CASEIN-GELATIN MIXTURE AND HERRING OIL IN EXPERIMENTAL DIETS

Lee, D. J., and J. H. Wales (Dept. of Food Science and Technology, Oregon State University, Corvallis, OR 97331)
Journal of the Fisheries Research Board of Canada 30, No. 7, 1017-1020 (July 1973)

In most nutritional studies with animals, growth is the primary criterion used to evaluate diets; less attention is given to the effects of the diet on the structure of the tissues and organs. In this study, young rainbow trout were fed for 18 weeks semipurified diets containing varying levels of herring oil (8% to 24%), a protein mix consisting of 70% casein and 30% gelatin (35.56% to 53.33%), and starch (8.90% to 26.67%). The trout fed diets containing 53.33% protein and herring oil levels of 8% and 16% developed livers with abnormal nuclei, bile duct proliferation, and some parenchymal cell injury. Trout fed diets of the same level of protein but with 24% herring oil did not develop these liver abnormalities. When the protein levels were increased along with a lowering of the starch levels, large livers with high glycogen content were formed in the trout; this effect was not as pronounced at the high level (24%) of herring oil. These liver abnormalities apparently did not impair growth of the trout because their weight gains were unrelated to the condition of the liver tissues.
[2 tables, 9 references]

FTP

MARINE FISHERIES ABSTRACTS VOL. 26 NO. 10 PAGE 29

9.13 (9.19) UPTAKE AND BIOTRANSFORMATION OF PHENYLMERCURIC ACETATE BY AQUATIC ORGANISMS

Fang, S. C. (Dept. of Agricultural Chemistry, Oregon State University, Corvallis, OR 97331)
Archives of Environmental Contamination and Toxicology 1, No. 1, 18-26 (Feb. 1973)
(Springer-Verlag New York Inc., 175 Fifth Ave., New York, NY 10010)

Phenylmercuric acetate (PMA) is used as a slimeicide in the pulp and paper industry; some PMA may be discharged into waste water and thus become a possible contaminant in water systems. In this study, the researchers determined the uptake and metabolism of ^{203}Hg -labeled PMA by guppies (*Lebistes reticulatus*), snails (*Helisoma campanulata*), elodea (*Elodea canadensis*), and coontail (*Ceratophyllum demersum*). Glass aquariums of 4 to 7 liters were used (with aeration). ^{203}Hg -PMA was added to give an initial concentration of PMA ranging from $5 \times 10^{-8}\text{M}$ to $5 \times 10^{-7}\text{M}$. The organisms were placed in the water, and samples of organisms and water were taken periodically for examination during the exposure period of about 96 h. No radioactivity remained in the water after 96 h; the total uptake by guppies and elodea was about 12% of the ^{203}Hg -PMA in the aquarium, with the remainder probably being lost to the air through evaporation. The organisms readily take up the PMA, and the amount of uptake is related to the concentration level and the time of exposure. The PMA absorbed is converted mainly to inorganic mercury, with ethylmercuric chloride as a minor metabolic product. ^{203}Hg is not readily eliminated from the guppy, elodea, and coontail when they are placed in fresh water after exposure to PMA; the biological half-life of the ^{203}Hg residues ranged from 43 to 58 days.
[4 figures, 3 tables, 5 references]

FTP

9.12 (9.125) (9.6) PACIFIC FISHES OF CANADA

Hart, J. L. (St. Andrews, New Brunswick, Canada)
Fisheries Research Board of Canada Bulletin 180, Ottawa, Canada (1973), ix + 740 pp.
Price \$9.60.

This book contains descriptions of 325 kinds of fishes with regard to common and scientific names; observations on head spines, fins, counts of gill rakers and vertebrae; in addition, size, distribution, utilization, and life history of the fishes are given. A sketch of each species with a short description are shown for aid in recognition. Analytical keys for assistance in recognizing the species are included; more than 54 new species of fish have been identified and included. Color photographs of five species of salmon show the contrast between fresh-run and spawning individuals. A gazetteer of locations mentioned in the text, a glossary of terms used, notes on species illustrations, a large list of references, and an index of common and scientific names may be used to expand the initial uses of the book by students and laymen.

SW

Chemical Abstracts 78, No. 9, 56788r (Mar. 5, 1973)

9.14 CONTENT OF AMINO ACIDS IN THE PROTEINS OF LOWER AQUATIC ANIMALS AND ITS SIGNIFICANCE FOR FISH NUTRITION

Albrecht, Marie Luise, and J. Wuensche (Forschungszent. Tierprod. Dummerstorf/Rostock, Dtsch. Akad. Landwirtschaftswiss. Berlin, Dummerstorf/Rostock, East Germany)

Chemical Abstracts 78, No. 9, 56788r (Mar. 5, 1973)

9.16 MECHANISMS CONTROLLING MIGRATION OF SOCKEYE SALMON FRY

Brannon, E. L.
Bulletin No. 21 of the International Pacific Salmon Fisheries Commission, New Westminster, British Columbia, Canada (1972), 86 pp.

The long and rigorous migrations of Pacific salmon through ocean and river to return to their spawning stream have attracted the attention of many observers. The migrations of young salmonid fry from their incubation site to their freshwater rearing nursery area, not as well known, were investigated to elucidate the life history of these fish.

Sockeye salmon fry from six areas in the Fraser River watershed were investigated to determine the causes of migratory behavior. Different migratory behavior patterns were displayed by fish from each of the six populations. Size and age were found not to be a causal mechanism; instead, responses were made to the current velocity of a stream. In addition, olfactory stimuli relating to source of water and odor influenced directional behavior. Temperature of the water, and light, influenced the intensity of the responses, but they were not directing factors. In the absence of current in the lake environment, light appeared to provide the stimulus for migration.

The evidence provided by the study indicates that fry migration is a genetically based behavior pattern influenced by current velocities, olfactory stimuli, and other race specific factors. In the rehabilitation of areas barren of fish, not only is an assessment of changes in the aquatic environment necessary, but the migration behavior of sockeye fry must be also considered.
[20 figures, 24 tables, 41 references]

SW

9.15 SCOLECOPASIDIUM HUMICOLA, A FUNGAL PATHOGEN OF FISH

Ross, A. J., and W. T. Yasutake (Bureau of Sport Fisheries and Wildlife, Western Fish Disease Laboratory, Seattle, WA 98115)
Journal of the Fisheries Research Board of Canada 30, No. 7, 994-995 (July 1973)

The previously undescribed pathogen (*S. humicola*) of fish was isolated from coho salmon. In natural infections, the kidney of the fish was affected most. The disease was difficult to transmit experimentally and it seems to be weakly contagious.

[3 figures, 4 references]

FTP

9.15 ATTEMPT TO LIMIT THE OUTBREAK OF ILLNESS IN FISH HATCHERIES

Hastein, Tore (Hr. Jakt, Vilsteill Ferskvannafiske, Veterinærinst., Norway)
Chemical Abstracts 72, No. 3, 16001t (July 23, 1973)

9.16 CHINESE FRESHWATER FISH CULTURE

(1.0152) (9.6) (CHUNGKUO TAN SHUI YÜ LEI YANG CHIH HSÜEH)

Prepared by 14 members of the Committee to Summarize Experience on Freshwater Fish Raising, in cooperation with the Ministry of Fisheries and the Chinese Academy of Sciences, Peking, China (1961), 612 pp.

Tyson R. Roberts (Museum of Comparative Zoology, Cambridge, MA 02138), Choon-Ho Park, and Robert Straus (reviewers)
Transactions of the American Fisheries Society 102, No. 3, 668-669 (July 1973)

This book is intended for persons involved with the commercial culture of fish, and for members of scientific research organizations and educational institutions. It appears to be the most recent, comprehensive, and authoritative account of the fish culture practiced in China. The various topics discussed in the 14 chapters include: history; reproduction of the species of fish; feeding of fishes; raising fry; culture of fish in ponds, in rivers, in rice paddies, and in reservoirs; control of fish diseases; harvesting, preservation of the harvest; and preparation of byproducts (meal, oil, and glue). In 1958, the Chinese national output of aquatic products was 6,020,000 tons of which rearing in fresh and in salt water provided 2,570,000 tons or 42.6% of the total. The predominant species used in aquaculture consist of (listed in order of decreasing importance): (1) *Ctenopharyngodon idella*, (2) *Mylopharyngodon piceus*, (3) *Hypophthalmichthys molitrix*, (4) *Aristichthys nobilis*, (5) *Cyprinus carpio*, (6) *Carassius auratus*, (7) *Parabramis pekinensis*, (8) *Cirrhina molitorella*, (9) *Elopichthys bambusa*, (10) *Mugil cephalus*, (11) *Siniperca chautsi*, (12) *Ophioccephalus argus*, (13) *Parasilurus asotus*. The purpose of these feeding trials with carp was to obtain further information on certain problems involved in the intensive culture of carp, namely, the optimum ratio of energy to protein, the optimum nutrient density, and the effect of fiber on energy utilization. The carp were maintained in wire cages (2.0 x 1.0 x 0.6 m) at a stocking density of 200 fish per cage. The wire cages were suspended in a pond, near the embankment. Experimental rations (in the form of 4 mm pellets) were fed twice daily to the carp at a rate of 4% of the weight of the fish. The feeding tests lasted about 1 month; the fish were weighed every 10 days during this period. All rations contained 25% crude protein but differed in their metabolizable energy content. Sterilized cow manure or poultry litter was included in some of the feeding trials. Also, soybean oil (4% or 5%) was added to the pellets to determine the effect on the growth of the carp.

The weight increase of the carp correlated directly with the energy content of the rations. The highest growth rate was obtained at the energy to protein ratio of 118 to 1; however, a still higher ratio may be necessary for optimal growth. The growth rates of the carp were reduced by the inclusion of cow manure or poultry litter in the rations; apparently the fast growing carp are unable to utilize fiber as a source of energy. The growth rate of the carp increased when soybean oil was added to the pellets.

[6 figures, 6 tables, 10 references]

FTP

9.16 (9.3)

RACEWAYS; EXOTIC SPECIES MOST AFFECTED BY PROPOSED E.P.A. DISCHARGE PERMITS

Culley, Dudley D., Jr.

American Fish Farmer & World Aquaculture News 4, No. 8, 9-12 (July 1973)

The National Pollutant Discharge Elimination System (NPDES) is administered by the Environmental Protection Agency (EPA). Part 125 of title 40 of the Code of Federal Regulations contains the rules under which the policies and procedures of the NPDES are prepared. A proposal to amend the regulations has been announced by the EPA. Two types of commercial aquaculture operations will be affected by the change--raceway culture and culture of nonnative fish.

Fish culture operations involving raceway production, with water discharges occurring more than 30 days per year, will require a permit if the proposed rule change is adopted. To avoid the requirement for a permit, the alternatives are either the installation of a holding lagoon or recirculation of waste water through purification systems so that discharges can be held to less than 30 days per year. The author suggests that a permit system would serve as an economic incentive for aquaculturists to become more efficient in their operations. For example, to maintain the approved quality of water discharged from a fish farm, feed must be utilized at a high level, otherwise unused feed contributes to the wastes in the discharged water and adds to the costs of the operation.

Control of the cultivation of nonnative species is necessary because of the threat that pathogens or parasites harmful to native ecosystems or to man might be

9.16 EXPERIMENTS IN THE NUTRITION OF CARP GROWING IN CAGES

Shiloh, Shaul (Ein Hamifraz), and Shlomo Viola (MILIOUBAR, D.N., Ashrath) Bamedgeh 25, No. 1, 17-31 (Mar. 1973)

The purpose of these feeding trials with carp was to obtain further information on certain problems involved in the intensive culture of carp, namely, the optimum ratio of energy to protein, the optimum nutrient density, and the effect of fiber on energy utilization. The carp were maintained in wire cages (2.0 x 1.0 x 0.6 m) at a stocking density of 200 fish per cage. The wire cages were suspended in a pond, near the embankment. Experimental rations (in the form of 4 mm pellets) were fed twice daily to the carp at a rate of 4% of the weight of the fish. The feeding tests lasted about 1 month; the fish were weighed every 10 days during this period. All rations contained 25% crude protein but differed in their metabolizable energy content. Sterilized cow manure or poultry litter was included in some of the feeding trials. Also, soybean oil (4% or 5%) was added to the pellets to determine the effect on the growth of the carp.

The weight increase of the carp correlated directly with the energy content of the rations. The highest growth rate was obtained at the energy to protein ratio of 118 to 1; however, a still higher ratio may be necessary for optimal growth. The growth rates of the carp were reduced by the inclusion of cow manure or poultry litter in the rations; apparently the fast growing carp are unable to utilize fiber as a source of energy. The growth rate of the carp increased when soybean oil was added to the pellets.

[6 figures, 6 tables, 10 references]

FTP

9.17

MANAGEMENT OF FISHERIES; ECOLOGICAL SUBSYSTEMS

Dickie, L. M. (Marine Ecology Laboratory, Fisheries Research Board of Canada, Bedford Institute, Dartmouth, Nova Scotia, Canada)
Transactions of the American Fisheries Society 102, No. 2, 470-480 (Apr. 1973)

This paper was presented to the American Fisheries Society at a meeting in New York, N.Y. in 1970. The author suggested that there is a critical lack of knowledge in the ecological branch of science upon which managers and their scientist advisers depend for guidance. He also commented that there is an abundance of data and observations in many fisheries; what is lacking are the kinds of generalizations which enable testable predictions to be formulated about exploited ecosystems. The author believes that there is a limited ability available to predict the influence of various factors on the catch of fish. The author reviewed fishery models relating fishing effort to the rate of exploitation based on various inputs. He suggested that the conformation of statistical data to the models is too poor to apply to fishery management.

The author believes that more effort must be spent on developing generalizations which will help to simplify fishery systems that are being exploited; in addition, he suggests that more research effort be devoted to the measurement of the overall fishery system properties rather than continue more intensive description of changes in the component parts such as sizes of catch or numbers of boats. The recent history of aquatic ecology and fisheries indicates that these stages are developing.

[2 figures, 24 references]

SW

9.16 THE RESPONSE OF RAINBOW TROUT TO VARYING PROTEIN/ENERGY RATIOS IN A TEST DIET

Lee, D. J., and G. B. Putnam (Dept. of Food Science and Technology, Oregon State University, Corvallis, OR 97331)
Journal of Nutrition 103, No. 6, 916-922 (June 1973)

Nine semipurified diets containing protein/energy ratios that ranged from 73 to 162 mg protein/kilocalories were fed to young rainbow trout for 18 weeks. A casein-gelatin (70-30) mixture and herring oil were each fed at three levels in a factorial type of experiment. Each of the casein-gelatin levels (36, 44 and 53%) was fed at each of the fat levels (8, 16 and 24%). Cornstarch was added at the expense of the casein-gelatin mix to adjust dietary protein levels. Caloric intake regulated feed consumption; and except for diets low in both fat and protein, no significant differences in weight gains were noted, although feed and energy conversions were markedly influenced. Higher protein/calorie ratios were positively correlated with liver size, level of liver sugars, percentage body fat, percentage body protein, and negatively correlated with percentage liver lipids, size of gastrointestinal tract and gain/gram ingested protein. These correlations were observed for similar protein/calorie ratios regardless of the dietary levels of protein and lipid.

Authors' abstract

[5 tables, 17 references]

9.16 (1.0152)(9.6)

(14) *Erythroculter ilishaformis*, (15) *Xenocypris argentea*, (16) *Acipenser sinensis*, (17) *Hemiculter leucisculus*, (18) *Pseudobagrus fluviatilis*, (19) *Esox reicherti*, and (20) *Hucho taimen*. The family Cyprinidae includes the first nine species. About one-half the entire inland cultured fish harvest consists of the first four species (grass carp, black carp, silver carp, and big-head carp).

Library of Congress call number for this book is QL634. C5 C54; the copy examined by the reviewers is in the Harvard-Yenching Library, call No. 7748/5631.

The book has 216 figures, 10 color plates, and 90 tables.

FTP

----- FTP -----
This float-equipped cage is used for breeding or storing shellfish, particularly oysters or mussels.

Halambrenner, Lazare Nathan (17 bd. Edgar Quinet, Colombes, France) (pat.)
U.S. Patent 3,741,159 (June 26, 1973)

9.16 CAGE FOR BREEDING SHELLFISH

9.17 ENVIRONMENTAL EFFECTS OF HYDRAULIC DREDGING IN ESTUARIES
(9.19)

May, Edwin B. (Alabama Dept. of Conservation and Natural Resources, Marine Resources Division, Dauphin Island, AL 36528)
Alabama Marine Resources Bulletin No. 9, Marine Resources Laboratory, Dept. of Conservation and Natural Resources, Dauphin Island, AL 36528 (Apr. 1973), 85 pp.

The purpose of this study was to determine the immediate and long-term physical, chemical, and biological effects of hydraulic dredging and open water spoil disposal in estuaries, with particular emphasis on Mobile Bay, Ala. The author concludes that hydraulic channel and shell dredging and open water spoil disposal have little significant immediate effect on water quality in Alabama estuaries. Practically all the sediment discharged by the dredges settles rapidly and is transported by gravity along the bottom as a separate flocculated density layer; the potentially harmful components of the mud are not dissolved in the water. Dredging results in a limited and temporary reduction in benthic organisms. The spoil piles (from channel dredging) can indirectly affect the ecology and usefulness of estuaries by interfering with the circulation of water and by altering the salinity. The water and sediment in coastal Alabama are similar to many other estuaries and thus the observations made in the present study should be applicable in other areas, because basic hydrological concepts control dredge effluent dispersion and subsequent effects on water quality.

[27 figures, 13 tables, 100 references]

FTP

9.16 (9.3)

introduced through the discharged waste water. Carp, goldfish, and brown trout are excluded from the category of nonnative fishes. Exotic fishes also may involve the risk, if they escape into the environment, of becoming destructive nuisances or hazards in an established ecology. Universities and research institutions are subject to the same rule change. The author suggests that more effort from other agencies must be exerted to control the introduction and management of nonnative species which the proposed permit system will not affect.

Fish rearing operations conducted in closed ponds will not require a permit under the proposed rule change.

SW

Tsai, Chu-Fa (National Resources Institute, University of Maryland, College Park, MD 20742)
Transactions of the American Fisheries Society 102, No. 2, 281-292 (Apr. 1973)

Earlier reports have indicated that increased biological oxygen demand (BOD) and resulting oxygen depletion, caused by the organic material in sewage discharges in streams, had an adverse effect on fish and other aquatic life. Later workers, in contrast, reported that numbers of individuals and species of fish gradually increased downstream of a sewage outfall, although the dissolved oxygen (DO) had gradually decreased. The author concluded that DO is not the deciding factor in limiting the presence of fish; instead, sewage toxicity may be the major factor in fish distribution downstream of sewage discharges.

Experiments were performed to determine the effects of water degradation on fish depletion, to define water degradation limits for each fish species, and to eventually establish water quality criteria for protection of fish in sewage polluted streams. Of 139 domestic sewage treatment plants studied in Maryland, northern Virginia, and Pennsylvania, three major types were found: type I (the majority) had facilities for sludge activation, aeration, sedimentation, and filtration with effluent chlorination; type II (10 plants) had the same facilities as type I plus a holding lagoon after chlorination of the effluent; type III (4 plants) had the same facilities as type I plus a lagoon with chlorination at the lagoon outlet. Water quality determinations were made from samples taken from upstream and downstream stations at each treatment plant. Standard methods (of the American

Bryson, Dale S. (Enforcement Div., Region V, U.S. Environmental Protection Agency) Food Engineering 42, No. 6, 68-69 (June 1973)

The Federal Water Pollution Control Act of 1972 is the basis for development of a tight regulatory system which is expected to establish precise, detailed abatement requirements. The regulations will be enforced through simplification of cumbersome legal procedures and exaction of heavy penalties for violations.

The new law requires establishment of effluent limits that a plant will be permitted to discharge into public waterways. Furthermore, by 1977 each industry must apply the best practicable control technology available at that time. The penalties of the law include fines of up to \$10,000 per day and other civil remedies and administrative actions. Willful or negligent violations will result in criminal penalties of up to \$25,000 per day of occurrence. Every industry will be required to apply for a permit under Section 402 of the law. Each permit will contain, in a single document, the complete schedule of requirements for each individual plant with copies available to state and federal officials and private citizens. Many states already have permit programs, but the Environmental Protection Agency (EPA) is working for an effective national program which includes authorizing the states to apply the regulations.

The EPA has developed a vast amount of information to guide its personnel in determining that a plant is applying the best practical control technology.

Not only will the oxygen demand of wastes be limited but total suspended solids, pH, temperature, oil, heavy metals, and toxic substances will also be limited. One of the major objectives of the EPA will be to ensure cooperation between it and the state agencies to meet the strict requirements of the new law. SW

Sanders, Herman O., Foster L. Mayer, Jr., and David F. Walsh (Fish-Pesticide Research Laboratory, Bureau of Sport Fisheries and Wildlife, U.S. Dept. of the Interior, Columbia, MO 65201)
Environmental Research 5, No. 1, 84-90 (Mar. 1973)

Phthalic acid esters are widely used as plasticizers, particularly in the polyvinyl chloride plastics. Plasticizers (chemicals) are added to synthetic plastic resins to impart flexibility to the product, to improve workability during fabrication, and to extend or modify properties not present in the original resin. Plasticizers are being used in such large amounts it is conceivable that they could easily, although inadvertently, contribute to environmental pollution. This paper is a report on the toxicology of di-2-ethylhexyl and di-n-butyl phthalate in some freshwater invertebrates.

Five species of crustacea were used as the test invertebrates (scud, *Gammarus pseudolimnaeus*; glass shrimp, *Palaeomonetes kadiakensis*; crayfish, *Oreochetes nais*; waterflea, *Daphnia magna*; and aquatic sowbug, *Asellus brevicandus*) and three species of immature aquatic insects (damselfly nymphs, *Ischnura verticalis*; burrowing mayfly, *Hexagenia bilineata*; and midge larvae, *Chironomus plumosus*). Acute toxicity tests were carried out under static conditions using the method of H. O. Sanders [Bur. Sport Fish. Wildl. Tech. Paper 25 (1969)]. The toxic effect was evaluated as the median tolerance limit (TL₅₀), the concentration of the toxin in water that produces a 50% response in the test organisms under the test conditions.

Prepared by the Institute of Food Technologists' Expert Panel on Food Safety and Nutrition
Journal of Food Science 38, No. 4, 729-734 (May-June 1973)

Since mercury is ubiquitous, everyone consumes trace amounts. It can be found in all food and water, with higher concentrations in foods grown in areas having higher concentrations of mercury in soil. The short-chain alkyl mercury compounds, methyl, dimethyl and ethyl mercury, are more toxic than elemental mercury, inorganic salts of mercury and the aryl mercury compounds. Since mercury is excreted in feces, sweat and exhaled breath as well as in urine, a daily intake of 1.0 mg per day of elemental mercury or inorganic mercury salts appears safe. The USDA [U.S. Dept. of Labor] established an allowable level of 0.1 mg elemental mercury vapor or inorganic salts of mercury and 0.01 mg alkyl mercury per cubic meter of air for industrial exposures. The average U.S. diet contains less than 1/50 this amount. Epidemiological studies in several locations of elevated mercury content show no cases of methyl mercury poisoning resulting from fish consumption in the U.S. FDA does not allow the sale of fish containing more than 0.5 ppm (0.5 mg/kg) of mercury, and the canned tuna industry now includes mercury content as one of their quality specifications. The naturally occurring element, mercury, does not appear to pose a toxic hazard in the food supply of the U.S. and there is no evidence that alkyl mercury formed by microorganisms in nature has led to methyl mercury poisoning; however, this does not imply there is no reason to control the release of elemental mercury and inorganic salts of mercury into the environment from

9.19
(9.3)

MERCURY IN FISH AND THE NEWS MEDIA

Olley, June (CSIRO, Division of Food Research, Hobart, Australia)
Food Technology in Australia 25, No. 5, 270 (May 1973)

The author suggests that the articles on mercury and other pollutants in the scientific literature do not explain clearly whether concentrations are based upon wet weight or dry weight. She also believes that articles in the mass media startle the public by including the high results in studies of pollutants in food expressed in parts per million dry weight; these results are then compared with the regulations of pollutants in food of another country which usually uses parts per million wet weight. Citing an earlier report [Australian Fisheries 31, No. 10, 4 (1972)], the author states that wet weight is implicit in the Australian regulations. She gave practical examples of the parts per million concept. Fish containing 0.5 p/m mercury wet weight (the official limit) means that 1 million lb of fish as eaten (not dry) would contain $\frac{1}{2}$ lb of mercury. Additionally, the flesh of cod contains about 80% water. If the average mercury content of cod taken from the Thames River estuary is 0.36 p/m then the dry-weight mercury content is 5×0.36 p/m or 1.80 p/m dry weight. The necessity for specifying wet or dry weight becomes clear when the mercury content expressed as wet weight (0.36 p/m) is acceptable and expressed as dry weight (1.80 p/m) is banned by official standards. The author suggests that the press reports and radio broadcasts should be based on responsible attitudes toward these points; and scientists should make certain that their data are not liable to ambiguous interpretation.

[7 references]

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9.2

ECONOMIC AND POLITICAL OBJECTIVES IN FISHERY MANAGEMENT

Crutchfield, James A. (Dept. of Economics, University of Washington, Seattle, WA 98195)
Transactions of the American Fisheries Society 102, No. 2, 481-491 (Apr. 1973)

This paper was delivered at a meeting of the American Fisheries Society in New York, N.Y., in Sept. 1970. The author suggests that the condition of the fisheries represents all the major causes of market-mechanism failure, and that public intervention is required to manage them. The industry is faced with the necessity of shifting from single objectives in management to multiple objectives to be used in evaluating programs and policies for publicly funded management goals. These multiple objectives cannot be expressed in a common term such as dollars, but in a cluster of goals such as contribution to net economic output, income redistribution, balance of payments equilibrium, reduction in unemployment, and freedom from arbitrary government action. The author calls these "a multidimensional set of public interest elements," and explicit choices must be made between conflicting objectives as goals of programs and policies. The author believes that an optimal solution to selection of these multiple goals is not likely. However, he suggests that the political process would force some objectives to remain unchanged while subject to other requirements such as uniform fishing gear or a minimum of unemployment in a fishery. In international fishery management, the objectives must be modified to accommodate different national objectives which are based on internal differences. The author states that, "identification of multiple goals is the essential first step toward efficient formulation of fishery programs."

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9.19
(9.13)

BIOACTIVE COMPOUNDS IN THE AQUATIC ENVIRONMENT:

UPTAKE AND LOSS OF DDT AND DIELDRIN BY FRESHWATER MUSSELS

Bedford, J. W. (Bureau of Water Management, Dept. of Natural Resources, Lansing, MI 48914), and M. J. Zabik
Archives of Environmental Contamination and Toxicology 1, No. 2, 97-111 (July 1973)

Freshwater mussels have been used by certain regulatory agencies to monitor pesticide chemicals in fresh waters, even though little is known about the uptake, metabolism, and elimination of insecticide chemicals by these organisms. Also, little is known about the significance of certain levels of pesticide chemicals in the mussels in relation to the levels in the environment. The purpose of the present study was (1) to obtain information on the time required for the pesticide residue level in the mussel to reach equilibrium with the level in water, (2) to determine the half-life of the pesticide residue in the mussel after exposure to the chemical was terminated, and (3) to find out where the pesticide residues (and their metabolites) are stored in the mussel, and to correlate the level of the pesticide residue stored in the mussel with that in the water. The freshwater mussels used were *Anodonta grandis*, *Elliptio dilatatus*, and *Lampsilis silicoides*. The mussels were exposed to several levels of DDT and HEOD in natural lake water and in reconstituted distilled water, under continuous flow and constant temperature conditions. [DDT = 1,1,1-trichloro-2,2-bis-(p-chlorophenyl)ethane; and HEOD = 1,2,3,4,10,10-hexachloro-6,7-epoxy-1,4,4a,5,6,7,8a-octahydro-1,4-endo-exo-5,8-dimethanonaphthalene, the principle component of dieldrin.]

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9.2
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THE POLLUTION CONTENT OF AMERICAN TRADE

Wallier, Ingo (New York University)
Western Economic Journal 11, No. 1, 61-70 (Mar. 1973)

The capacity of the environment to assimilate pollutants is a determinant of supply conditions and, thus, is a factor affecting comparative advantage. No doubt national political collectivities will differ to some degree in their assessments of what is an "acceptable" environment (viewed as a matter of social preference). Both of these factors then will have a bearing on the determination of national environmental-control standards, and on the economic cost of meeting the standards. As these costs are passed forward to purchasers or back to producers and taxpayers, and as productive resources are more and more being devoted to maintenance and restoration of environmental balance, the patterns of international trade and investment will inevitably shift. Little information is available on international differences in environmental assimilative capacities, social preferences, and techniques of implementing environmental-control standards. In the present study, the author attempts to determine, at least in a preliminary way, whether environmental-control charges actually incurred by industry form an essentially "trade-neutral" pattern, or whether they are fundamentally export-biased or import-biased. Thus, should U.S. exports be more pollution-intensive than are imports, then whatever pattern of environmental policies eventually emerges among the major trading nations will impact disproportionately on U.S. performance in the international market.

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In discussing the theoretical basis for management, the author believes that the greatest difficulties in development and management of real fisheries will arise in producing satisfactory, short period, biological models of dynamic adjustment, particularly of fish stocks subject to a wide range of hazards besides those of fishing. The crucial issue for management is not how many statistics can be used, but how few are essential to gain most of the benefits of timely action.

The author believes that the decision makers in industry and government are becoming aware of the conflicts over the physical yield versus economic benefits as primary objectives of fishery management. He suggests that fishery administrations at state, national, and international levels cannot develop properly weighted multiple-objective programs because they have no specialists competent to deal with such issues. Adequate staffing with economic and political analysts is necessary as an integral part of management.

[14 references] SW

9.2
(1.013)(1.21)

MANAGEMENT OF THE PERUVIAN ANCHOVETA RESOURCE

Holmsen, Andreas A. (Dept. of Resource Economics, University of Rhode Island)
NOAA Technical Report NMFS CIRC-371, National Marine Fisheries Service, NOAA, U.S.
Dept. of Commerce, Seattle, WA 98115 (Apr. 1973), pp. 106-111.

The best available estimate of the maximum sustainable yield of the Peruvian anchoveta resource is 9.5 million metric tons (±1 million). The productive capacity of the purse-seine fleet and the fishmeal factories far exceed this tonnage with the result that the open season is becoming shorter year by year. This paper describes the current fishery management program in Peru and the degree of overinvestment in the industry. It further outlines the alternative methods which can be used to reduce excess capacity in the catching and processing phase and the advantages and disadvantages of the various alternatives.

Author's abstract

[3 references]

9.2 (9.19)

Analysis of the entire range of traded goods and services reveals that 1.75% of the value of U.S. exports consisted of pollution-related costs and about 1.52% of the value of U.S. imports. This difference (15% higher for exports) appears not to be significant and suggests that environmental-control measures bearing on the respective supplies of U.S. exports and imports will be trade-neutral, or at worst only marginally biased against the United States. Thus, the product-profile of American exports does not seem to be systematically more or less pollution-intensive than does the product profile of American imports.

However, U.S. trade in individual industries may be vulnerable to increased environmental costs in terms of their international competitiveness. The vulnerability of a specific industry will be greater (1) the more competitive its products are in the international marketplace and (2) the higher its overall environmental-control loading. The author's data indicate that, all else equal, the U.S. international competitive position may be affected in industries such as ordnance and accessories, construction and mining equipment, and plastics, relative to industries such as apparel, fishery and forest products, and footwear, which are already characterized by a substantial competitive disadvantage or where environmental-control costs are not very important.

U.S. trade then will be affected if the world's nations adopt different environmental standards and/or ways of implementing such standards. On the other hand, if all countries apply and enforce identical environmental-control norms, trade flows of individual countries will be affected differently depending on their relative pollution intensity.

[2 tables, 28 references] FTP

9.19 (9.13)

The mussels concentrate DDT about 2,400-fold and HEOD 1,200-fold in lake water, and they concentrate DDT about 1,000-fold in reconstituted distilled water. The level of the insecticide chemicals in the mussels reaches equilibrium with the level in the water at a faster rate in lake water than it does in distilled water; also, the insecticide residues have a shorter half-life in the mussels than in the lake water. The half-life of the total DDT residues is 13.6 days in lake water, and the half-life of HEOD is 4.7 days in the same water. The insecticide residue levels are highest in the digestive and reproductive tissues, and lowest in the muscle, mantle, and gill tissues.

Three conclusions evolved from this study: (1) The previous conditioning and insecticide chemical residue burden of the mussel can influence the level of the insecticide chemical attained by the mussel. (2) The type of water into which the mussels are placed can influence the uptake of the pesticides. (3) The level of uptake by the mussels will vary with the insecticide chemical being monitored.

[2 figures, 3 tables, 14 references] FTP

METABOLISM AND TOXICITY OF POLYCHLORINATED BIPHENYLS

Yoshihara, Hidetoshi (Fac. Pharm. Sci., Kyushu Univ., Fukuoka, Japan)
Chemical Abstracts 78, No. 23, 144045b (June 11, 1973)

9.19

EXPORT OPPORTUNITIES FOR U.S. FISHERY PRODUCTS

Miller, Morton M., Jukka Kolhonen, and Gregory Hall (Market Research and Services Division, National Marine Fisheries Service, Washington, DC 20235)
Marine Fisheries Review 35, No. 7, 22-30 (July 1973)

Strong and growing world demand for fishery products and the recent favorable realignment of international currencies, from a U.S. viewpoint, combine to create attractive export opportunities for U.S. fishery products. This means expected growth for the traditional items on our export list and, too, an expanded opportunity for the exporting of fishery products derived from underutilized species, that is, species not traded in the U.S. domestic markets to a large degree.

The export possibilities for U.S. seafood products have been expanding considerably. Economic growth and rising incomes worldwide have sparked a growing demand for seafood products, particularly in the industrialized nations. Traditional sources of supply have been hard put to keep pace with the rising demand and buyers are actively searching world markets for new sources. International currency realignments, over the past 14 months, have lowered U.S. prices abroad and have made U.S. products more attractive to many foreign buyers.

The authors indicate an increasing demand for fishery products in Japan and in Europe. The opportunities to expand established markets for fresh and frozen salmon, canned salmon, shrimp, and fish roe are discussed. The potential for exporting new products (squid, Atlantic herring, mullet and other roes, croaker surimi, eels, silver hake, Pacific hake, Atlantic mackerel, mussels, sea urchin, and Alaska pollock) are also discussed.

[9 figures, 9 tables, 5 references]
Abstracted in part and extracted

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AGREEMENTS SIGNED DURING GENERAL SECRETARY BREZHNEV'S VISIT TO THE UNITED STATES

Anonymous
Department of State Bulletin 69, No. 1778, 158-175 (July 23, 1973)

One of the agreements signed during the week of June 18, 1973 by President Nixon and General Secretary Brezhnev, and other officials was the "agreement between the Government of the United States of America and the Government of the Union of Soviet Socialist Republics on Cooperation in Studies of the World Ocean." Extracts of some and of parts of the articles of agreement are as follows:

The Parties will develop and carry out cooperation in studies of the World Ocean on the basis of equality, reciprocity and mutual benefit.

In their studies of the World Ocean, the Parties will direct cooperative efforts to the investigation and solution of important basic and applied research problems.

a. Large-scale ocean-atmosphere interaction, including laboratory studies, oceanic experiments, and mathematical modeling of the ocean-atmosphere system.

b. Ocean currents of planetary scale and other questions of ocean dynamics.

c. Geochemistry and marine chemistry of the World Ocean.

d. Geological and geophysical investigations of the World Ocean, including deep sea drilling for scientific purposes.

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PUBLIC RIGHTS AND COASTAL ZONE MANAGEMENT

Schoenbaum, Thomas J.
North Carolina Law Review 51, No. 1, 1-41 (Nov. 1972)

The coastal zone was considered to be limitless and to be freely used for recreation and profit. Settlement and industrialization caused pressures of conflicting use patterns which made management by government a necessity. The principal productive feature of the coastal zone is the estuary with its associated beaches and marshlands. Estuaries have been divided into four types: the drowned river valley such as Chesapeake Bay; the fjord type which consists of deep coastal indentures gouged out by glaciers such as occur in Norway, British Columbia, and Alaska; the bar-built estuary, characterized by shallow basins enclosed by a chain of barrier islands such as those found along the coast of North Carolina; and estuaries produced by tectonic processes--coastal indentures produced by geological faulting, such as San Francisco Bay. The river delta, such as the mouths of the Mississippi or the Nile Rivers, is another type of estuary. Salt marshes are integral parts of estuaries, and are now considered to be the most highly productive areas on earth. About 90% of the total harvest taken by commercial fishermen in the United States is dependent on the estuaries; and salt marshes are essential to coastal fisheries. These include shrimp, flounder, menhaden, bluefish, anchovies, and striped bass. Many species of birds and mammals also depend on the estuaries. Estuaries protect the land against ocean erosion, and salt marshes hold sediment that otherwise would be deposited in harbors and navigation channels. Legal and institutional changes are needed to protect estuarine resources. Important public

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UNITED STATES OCEANS POLITICS

Hollick, Ann L. (School of Advanced International Studies, Johns Hopkins University, Washington, D.C.)
San Diego Law Review 10, No. 3, 467-501 (May 1973)

Various agencies of the U.S. Government have been actively engaged since 1967 in formulating policy relating to the control and use of the oceans involving the various issues of exploitation of the seabed, the breadth of the territorial sea, transit rights through straits, and the conservation and allocation of fishery resources. These issues concern a complex array of national and commercial interests in the United States and abroad including interactions of interests and prespectives within the U.S. Government. This paper deals with the political activities behind the formulation of U.S. oceans policy.

[2 tables, 44 footnotes]

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Cooperation provided for in the preceding Articles may take the following forms:

- Joint planning, development, and implementation of research projects and programs;
 - Exchange of scientists, specialists, and advanced students;
 - Exchange of scientific and technical information, documentation, and experience, including the results of national oceanographic studies;
 - Convening of joint conferences, meetings, and seminars of specialists;
 - Appropriate participation by both countries in multilateral cooperative activities sponsored by international scientific organizations;
 - Facilitation by both Parties, in accordance with laws, rules and regulations of each country and relevant bilateral agreements, of use of appropriate port facilities of the two countries for ships' services and supplies, including provision for rest and changes of ships' personnel, in connection with carrying out cooperative activities.
- For implementation of this Agreement, there shall be established a US-USSR Joint Committee on Cooperation in World Ocean Studies.

Extracted in part

9.2 PRICE SPREADS OF FISH PRODUCTS AMONG PRODUCERS AND DISTRIBUTORS

Penn, Erwin S. (Economic Research Division, National Marine Fisheries Service, Washington, DC 20235)

Marine Fisheries Review 35, No. 7, 1-9 (July 1973)

To find the cause of the difference between the price the fisherman receives for his product and the ultimate price paid by the consumer, this report provides an analysis of how the consumer's dollar is distributed to four marketing levels: fisherman, processor, wholesaler, and retailer. The difference or margin between selling and purchasing prices of each level and the share of the consumer's dollar by each level and each cost component are calculated for 14 fish products. The report also analyzes the costs and profits incurred by each marketing function and describes the major influences on margin differences. The purpose of the study is to provide a systematic guide that individual firms in the fishery can use to examine their margins, costs, and profits for each fish product, and compare them with the figures presented in this study as national averages for the same product. Over half of the margin at the harvesting level is labor cost. Wage rates have been increasing faster than most costs, and this trend is likely to continue. The slow recruitment of resources of certain species and the lag in harvesting efficiency in some fisheries will further accelerate the increase in ex-vessel prices or fishermen's margin compared to other levels.

When price spreads of different periods are compared, the year-to-year changes are ascribed to one or more of the following seven factors: (1) demand and supply, (2) cost of production factors, (3) different profits made by producers and dealers, (4) degree of processing and extent of services, (5) quantity of imports, (6) re-valuation of currency, and (7) efficiency of the marketing system. [4 figures, 6 tables, 5 references]

Extracted

9.3

LAW OF THE SEA: EFFECTS OF VARYING COASTAL STATE CONTROLS ON MARINE RESEARCH. A SURVEY OF THE U.S. OCEAN SCIENCE COMMUNITY

Cheek, Conrad H. (Chemical Oceanography Branch, Ocean Sciences Division, Naval Research Laboratory, Washington, D.C.)
Ocean Development and International Law Journal 1, No. 2, 209-219 (Summer 1973)

This paper contains excerpts from a U.S. Government survey report distributed to selected members of the U.S. ocean science community in Dec. 1972. The excerpts include the summary of the study, the introduction, brief reference to results and discussion, and material on the item "Attitudes Toward Coastal State Requirements." The original survey was conducted to obtain information for use in evaluating how various postulated coastal State controls over scientific research could affect U.S. ocean scientists and their research programs. The distribution of the research at sea ran about 50% on and above the continental shelf, 30% beyond the continental shelf but landward of 200 nautical miles, and 20% beyond 200 nautical miles from land. There appeared to be a large but declining interest in the Caribbean, Mexican, and Canadian waters, and increasing interest in more remote waters, particularly those off the southern continents. Some interesting results of the survey are profiles of the attitudes of marine scientists toward several types of requirements and restrictions that coastal States impose as requisites to the granting of clearances. Apparently, U.S. scientists undertaking open marine research would probably not object to a coastal State's desire for participation and training of its personnel and for ensuring that research conducted in waters under its jurisdiction conform to stated intentions. They would, however, be concerned over requirements that involve jurisdiction over raw data and/or samples, publication rights, substantial additional time and/or expense, and substantial modification of research plans.

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rights are derived from state ownership of the lands and waters of the coastal zone, and under state law, several legal doctrines may provide a basis for public rights in privately owned land. Using North Carolina as an example, the author states that much of the land in the coastal zone is state or federal property. These lands can be administered with a view toward protecting the resources of the area in the public interest. No rights of public use can be created for privately held land without compensation, but regulations and restrictions can be adopted to prevent undesirable development. New coastal zone legislation should take into account the substantial rights possessed by the public under traditional legal principles. In addition, a coastal zone agency should be created to manage the area to ensure proper environmental development. The agency should have a planning function as well as regulatory duties. In this way, order can be brought to the decisionmaking processes that affect the coastal zone. A bill to be voted upon by the people of North Carolina regarding coastal zone management is included in an appendix to the article.

[206 footnotes]

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9.3 TREATY PROVISIONS CONCERNING MARINE SCIENCE RESEARCH

Burger, W. (Sand Point Oceanic Center, in Washington State)
Ocean Development and International Law Journal 1, No. 2, 159-184 (Summer 1973)

Most likely future law of the sea negotiations will consider specific treaty arrangements dealing with conduct of scientific research at sea. In this paper, the author discusses some general policies relevant to consideration of such treaty provisions and some particular issues involving area, vessel, and object coverage, the nature of rights and obligations, a proposed basic principle of noninterference, definition of research, and access to the various ocean regions subject to varying degrees of coastal authority and those beyond. The appendix is a Draft Treaty on Marine Science Research.

[18 footnotes]

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work
Researcher
Scientific research is absolutely necessary; traditionally, it has been considered as a prerogative of the state. Researchers receive the greatest rights of access to materials, and to ideas. Researchers should be encouraged to share the information resulting from their work.

Ringgaard, Gisele (Institut du Droit de la Paix et du Développement, Nice, France)
Ocean Development and International Law Journal 1, No. 2, 121-136 (Summer 1973)

SCIENTIFIC RESEARCH: FROM FREEDOM TO DEONTOLOGY

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9.3 (1.86) DRAINED WEIGHT DETERMINATION OF FROZEN GLAZED SNOW CRABMEAT

Miller, George A. (Food and Drug Administration, 909 First Ave., Seattle, WA 98104)
Journal of the Association of Official Analytical Chemists 56, No. 4, 886-887 (July 1973)

The snow crab currently accounts for a large proportion of the crab supply due to the scarcity of the Alaskan king crab. The product obtained from snow crab is marketed in the form of frozen glazed crabmeat. Tests were performed to evaluate the applicability of the methods for determining drained weight of Alaskan king crabmeat to snow crabmeat. A collaborative study was conducted on the official final action drained weight methods using Code of Federal Regulations (1972) Title 21, Sec. 3.34, method 18.006-18.007 and the Alaska King Crab Market and Control Board method 18.008-18.009 using snow crabmeat. Four packs analyzed by method 18.006-18.007 yielded an average recovery of 76% of put-in tissue weight; two packs analyzed by method 18.008-18.009 yielded an average recovery of 83% of put-in tissue weight. Both methods have been amended to include snow crabmeat. [1 table, 5 references]

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9.3 WIDE LIMITS AND "EQUITABLE" DISTRIBUTION OF SEABED RESOURCES

Anonymous

Ocean Development and International Law Journal 1, No. 2, 137-158 (Summer 1973)

The author discusses some of the drawbacks of a universally applied 200-mile limit for seabed resources. These drawbacks include: (1) The 200-mile limit has no significance; it is purely artificial and has little basis in nature. (2) adoption of a 200-mile limit universally might jeopardize the usefulness of establishing an international regime for deep seabed resources, and (3) opposition to the 200-mile limit by landlocked and shelf-locked countries from the standpoint of resource distribution. A systems approach is suggested that would maximize the objectives of existing international conventions, help promote the rational development of deep seabed resources, and help provide for equitable distribution of resources with provision for acceptable benefits to all major groups of countries. One solution that was proposed was to have the limit of coastal jurisdiction over seabed resources be defined in terms of the continental margin in conjunction with a scheme of progressive revenue sharing according to the distance from the coast, water depth, and the economic level of each country. [1 figure, 4 tables, 31 references]

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9.6 (9.12) EUROPEAN INLAND WATER FISH. A MULTILINGUAL CATALOGUE

Blanc, M., P. Banarescu, J.-L. Gaudet, and J.-C. Hureau (editors) (European Inland Fisheries Advisory Commission)
Food and Agriculture Organization of the United Nations, Rome, Italy (1971), xix + 131 pp. Published by Fishing News (Books) Ltd., 110 Fleet St., London, ECA
2JL, England. Price \$22.00; \$8.75.

This book provides a complete list of the fish in the inland waters of Europe with their Latin names and names in the language of the country where they are found. The explanation of how to use the catalog are given in English, French, Spanish, and German. Line drawings are used to identify the fish, and colored plates illustrate the appearance of typical species of the main families. In addition, there is a geographic chart to show the distribution of each species. Other information given for each species includes the official vernacular name in the country where it is found and scales and length data. A chart classifies the species in accordance with family, order, and class for quick reference. [418 illustrations]

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